NOVEMBER 26, 1951

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

Electronics:

Wave of Opportunity For Precision Producers

—page 82

EAST GERMANY GEARS UP
—Its Products Have Military Cast, p. 63

MANGANESE FROM SLAG
—Process Recovers 75 Per Cent, p. 84

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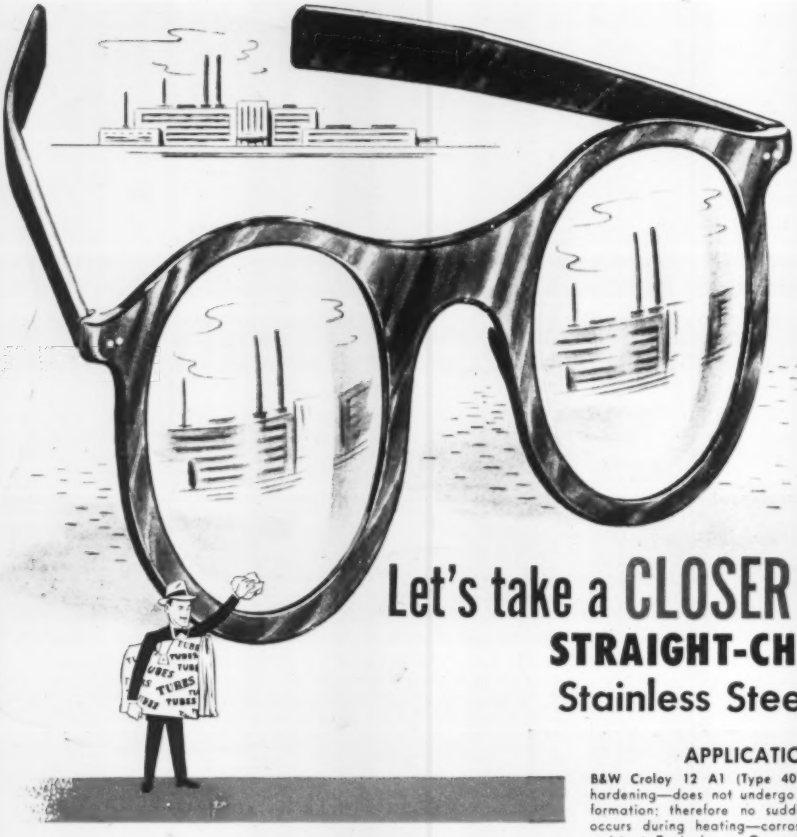

Let's take a CLOSER LOOK at STRAIGHT-CHROMIUM Stainless Steel Tubing

Present restrictions on nickel have cut production of austenitic stainless steel tubing far below demand. If this critical shortage of nickel-bearing stainless tubing is compelling you to find other suitable grades, you should take a closer look at the straight-chromium analyses.

Readily available in quantity from B&W are pipe and tubes of the four non-nickel-bearing types listed at the right with typical uses. These ferritic and martensitic steels are magnetic at ordinary temperatures after all conditions of heat treatment, have relatively high oxidation resistance at elevated temperatures, and resist attack by many corrosive media. With certain modifications in procedures, they can be satisfactorily fabricated by all methods applicable to austenitic grades.

For both pressure and mechanical applications, tubes of straight-chromium stainless analyses are worthy alternates for hard-to-get nickel-bearing stainless types. Would you like a copy of TDC-140 containing technical data on these easy-to-get grades of stainless tubes? Ask Mr. Tubes—your B&W Tube Representative—about their suitability for your applications.

APPLICATIONS

B&W Croloy 12 A1 (Type 405, Seamless)—Non-hardening—does not undergo appreciable transformation; therefore no sudden volume change occurs during heating—corrosion and oxidation resistant. Typical uses: Conveyor lines in oil refining and chemical processing, heat exchanger tubing, boiler tubing in mercury heat cycle, catalytic oil cracking processes where fins have been welded to tubes.

B&W Croloy 12 (Type 410, Seamless and Welded)—Hardenable—moderate corrosion and heat resistance. Typical uses: Machinery in the chemical and food processing and packaging fields.

B&W Croloy 18 (Type 430, Seamless and Welded)—Sufficient ductility for forming simple parts—good corrosion and oxidation resistance—can be polished or buffed to pleasing finish. Typical uses: Conveyor lines in chemical processing field; condensers and piping in production, transportation, and storage of nitric acid and in nitrating operations involving mixed acids; furnace parts; retorts; ornamental structures.

B&W Croloy 27 (Type 446, Seamless)—Corrosion resistant—excellent heat resisting qualities. Typical uses: Furnace parts, heat interchangers, kilns, pyrometer protection tubes, soot blower elements, dehydrogenation equipment in chemical and oil refining fields. Also well suited for glass sealing applications.

THE BABCOCK & WILCOX TUBE COMPANY

Executive Offices: **Beaver Falls, Pa.**

General Offices & Plants

Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing

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B&W SEAMLESS and WELDED TUBES

TA-16515

Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

High-Speed Tools at Lower Cost with Tungsten-Saving 66HS

Bethlehem 66HS performed so well during the alloy shortages of World War II that many users of high-speed steels never did go back to the large-scale use of 18 pct tungsten grades. 66HS has a balanced content of tungsten and molybdenum; and it has proved ideal for a wide variety of cutting tools. Because of its lower cost and many uses it is much more than just an able substitute for the high-tungsten steels.

In Bethlehem's own machine shops, for example, 66HS has been used since 1942 for more than 90 pct of all our high-speed tools. We use many tons of it each year; and our production men report that year after year this grade performs just as well or better than Special HS, our 18-4-1 type of steel.

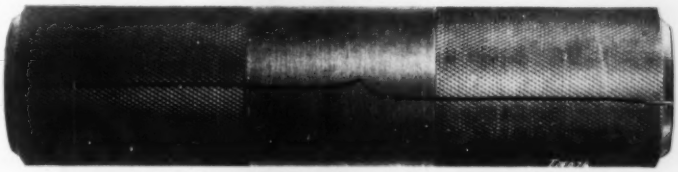
There's an economy angle to 66HS that shouldn't be overlooked, especially by large users. 66HS at present prices costs about $700 a ton less than standard 18-4-1 grades. And it's 6 pct lighter, too.

66HS is hardened at 100 degrees below the hardening temperature for high-tungsten grades. It requires careful heat-treating, but it presents no problem at all to any heat-treater who has accurate temperature indicators. This equipment is necessary because 66HS does *not* form beads of "sweat" on the surface when the proper hardening temperature is reached (2250 to 2275 F).

66HS has just the right degree of wear-resistance, toughness, and red-hardness for use nearly everywhere as a dependable, general-purpose cutting steel. Its typical analysis:

C	W	Mo	Cr	V
0.83	6.35	5.0	4.15	1.90

Like to know more about it? Ask for our Booklet 264, describing 66HS and other Bethlehem high-speed steels.



This 1⅜-in. diameter gage, made from oil-hardening tool steel, cracked because it wasn't tempered immediately after the quench. Tempering relieves stresses set up in the steel during hardening.

Tool Steel Troubles Usually Have Happy Endings

Based on the many thousands of investigations they've made, our metallurgists and research men say that probably less than 3 pct of tool failures can in any way be blamed on the tool steel.

Tool failures are usually cured by one or more of these remedies:

1. Improving the tool design
2. Using a more suitable tool steel
3. Correcting the heat-treatment
4. Improving tool-grinding technique

Some people who think they don't have tool problems quite often aren't getting best results. For example, a plant may suddenly have a series of broken tools or dies. We're called in to help put a finger on the cause. And quite likely we'll find they have been overlooking some vital factor in tool design or heat-treatment. Correcting the trouble leads to tool performance that's far beyond the best previous service life. That's why most tool steel troubles have a happy ending.

If you have a problem involving tool steel or feel you should be getting better tool performance, let us hear from you. Maybe we can give you the right answer pronto. Or a Bethlehem metallurgist may have to work with you in your shop. In either case, there's no obligation.

Our Tool Steel Engineer Says:

Making shock tools too hard causes premature failure

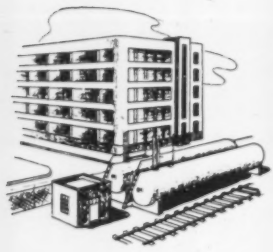
Most shock-resisting tool steels give best service when hardened between Rockwell C-55 and 60—averaging about C-58. This hardness range provides the best compromise between toughness and wear-resistance. Premature failure is often the result of obtaining an excessively high hardness in these grades. Carbon tool steels are often best for shock tools requiring a hardness above Rockwell C-59.

The chrome-tungsten grades of shock-resisting tool steel can be carburized to obtain greater wear-resistance. This treatment produces a thin, hard case on the tool surfaces, yet retains a tough core of lower hardness. This method is often used for master hobs, reamers, swaging dies, and various kinds of shock tools.

Bethlehem ULTRASONIC TESTED **Tool Steel**

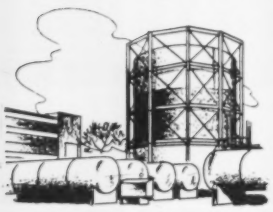
Philgas*

...A Uniform, Clean, Top-Quality LP-Gas



FOR INDUSTRIES

Leading industries use Phillips *66* Philgas successfully for heat treating, mold drying, core baking, ceramic firing and many, many other operations. Automatic Philgas systems assure constant furnace temperatures and atmospheres; constant pressures, high or low.



FOR UTILITIES

Many progressive utilities use Phillips *66* Philgas to augment natural or manufactured gas. High-quality Philgas is uniform in thermal value and gravity, and is free from harmful contaminants. Automatic operation cuts down on overhead.

*Philgas is the Phillips Petroleum Company brand name for its high quality propane-butane LP-Gas or bottle gas.

Phillips 66

PHILLIPS PETROLEUM COMPANY

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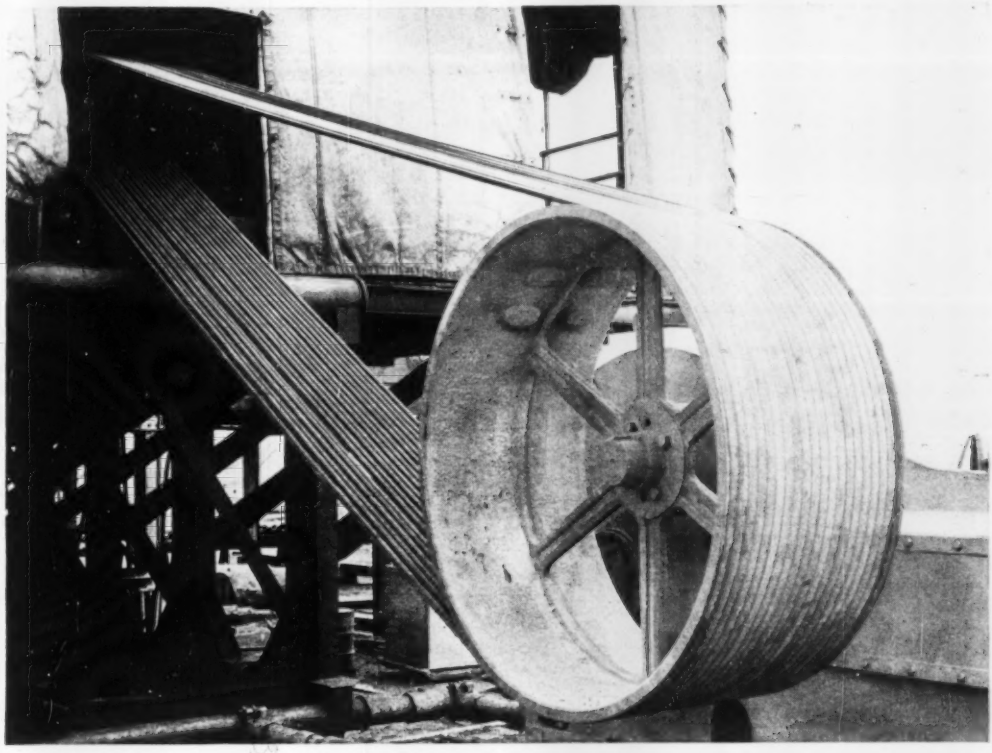
Offices located in Amarillo, Tex., Atlanta, Ga., Chicago, Ill., Denver, Colo., Des Moines, Ia., Pontiac, Mich., Indianapolis, Ind., Kansas City, Mo., Milwaukee, Wis., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., St. Louis, Mo., Tulsa, Okla., Wichita, Kan.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Here B. F. Goodrich grommet belts are saving $104.50 a month

B. F. Goodrich grommet V belts cut costs 20 to 50%

THESE 18 V belts are needed to drive heavy pumps for drilling oil wells. The belts have to operate 24 hours a day, 7 days a week, in all sorts of weather. Ordinary belts couldn't stand the heavy pulling load, couldn't take the strain of round-the-clock operation. They averaged 9 months' life in this kind of service.

Then B. F. Goodrich grommet belts were tried. After 19 months, and drilling wells totaling 76,000 feet deep, these grommet belts look as good today as the day they were installed. Here's why B. F. Goodrich grommet belts can be counted on to save on belt costs:

No cord ends — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet multiple-V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Because a grommet is endless, a grommet V belt is more flexible, grips the pullevs better. Size for size, grommet multiple-V belts will give ¼ more gripping power, pull heavier loads with a higher safety factor.

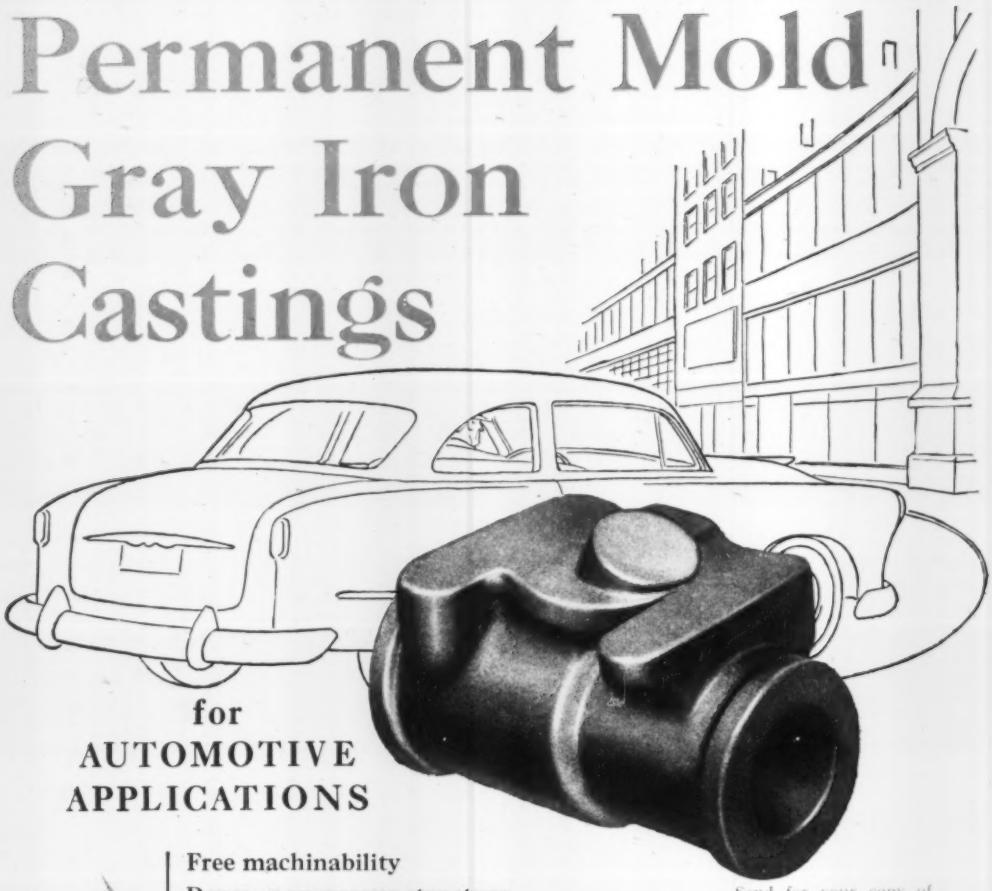
Only B. F. Goodrich has the grommet!—No other multiple-V belt is a grommet V belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B. F. Goodrich distributor. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.*

Grommet V Belts BY

B.F.Goodrich

RUBBER FOR INDUSTRY

Eaton Permanent Mold Gray Iron Castings



for AUTOMOTIVE APPLICATIONS

- Free machinability
- Dense, non-porous structure
- Uniform structure throughout the casting
- Freedom from leakage under pressure
- Machines to high, mirror-like finish
- Properly annealed; no growth or distortion after machining

Send for your copy of the illustrated booklet, "A Quick Picture of the Eaton Permanent Mold Process for Producing Gray Iron Castings."

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STEEL
The Weekly Magazine of Metalworking

VOL. 129 NO. 22 NOVEMBER 26, 1951

THIS WEEK IN METALWORKING

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Editorial and Business Staff—Page 10. Advertising Index—Page 160. Editorial index available semiannually. STEEL also is indexed by Engineering Index Inc., 29 West 39th St., New York 18.

Next Week ... **Reduce Tool Failure** ... **Batch Furnaces Achieve Continuous Production Rates** ... **Impregnation Methods Trim Casting Costs** ... **Nonprecision Machine Tools Adapted to Close Tolerances**

Published every Monday by the Penton Publishing Company, Penton Building, Cleveland 13, Ohio. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $20. Single copies (current issues) 50 cents. Metalworking Yearbook issue $2.00. Entered as second class matter at the postoffice in Cleveland, under the Act of March 3, 1879. Copyright 1951 by Penton Publishing Co.

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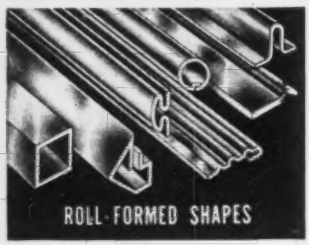
FOR "D. O." WORK



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For an estimate, send drawing and specifications, plus data on quantity, finish, length, etc. Werner can perform the following secondary operations—bending, drilling, punching, cutting, counter sinking and welding. Finishes—as extruded, polished or anodized.

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Behind the Scenes...

Cover Story

John Volkert Metal Stampings Inc., Queens Village, L. I., N. Y., and Fred Wittner Advertising agency, New York, came through handsomely for the photograph on this week's cover. In planning the cover, the editors wanted not just a photograph from any company connected with electronics industry. They needed a good picture from an electronics subcontractor, for subcontracting opportunities in the industry was decided upon as one important angle that the cover story would explore. Volkert filled the bill. It's an experienced supplier of precision stampings to electronics people, and it has some highly photographable operations.

Associate Editor Ed Karpick also called upon Volkert, as well as a score of other electronics specialists, for information to put in his story which begins on p. 82.

A Matter of Bats

The problems of steelmen are legion; now they're having troubles with bats.

Parts of the high-grade ore deposits in Liberia, Africa, were thought to be contaminated with a grayish covering. Republic Steel Corp., the recipient of the ore, was alarmed, but a study by the U. S. Geological Survey revealed that the contamination was a superficial alteration product derived in part from bat excreta. The phosphate mineralization is not believed to affect the value of the main ore bodies.

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The correspondent started off conventionally enough. To the question, which business paper do you read regularly, he answered, STEEL. But to the question, on what subject do you want more information in your favorite business paper, the correspondent replied, fishing.

That started our research people to checking; they discovered that the questionnaire had gone out Feb. 6, 1943, although the envelope in which the reply was returned bore a recent postmark. Further detective work revealed that Carl Peterson, advertising manager for Cleveland Crane & Engr. Co., Wickliffe, O., had found the thing when cleaning out his desk, so sent it in as a gag. How often does that man clean out his desk?

Hotel-Prosperity Week

You'll be interested to learn that the week of Nov. 26 is Prosperity Week. It's also Hotel Week. It must be no accident that the two fall in the same period, for we always have a certain sensation of prosperity whenever we stay in a hostelry. But we hasten to confess that we're usually operating on an expense account when we're in a hotel, and that could account for our unaccustomed sensation.

We're no Duncan Hines when it comes to judging the nation's inns, but one that has always given us the most delightful feeling of affluence is the Terrace Plaza in Cincinnati. There's something about those push-button beds and the modern decor in the rooms that gets us.

Namesake

Perceptive students of our masthead, which every week appears on p. 10, will note that we now have Fred Allen on the business staff. No. it's not Fred Allen of radio and television but Fred J. Allen of Griffin, Ga., who will be STEEL's sales representative in the South.

Puzzle Corner

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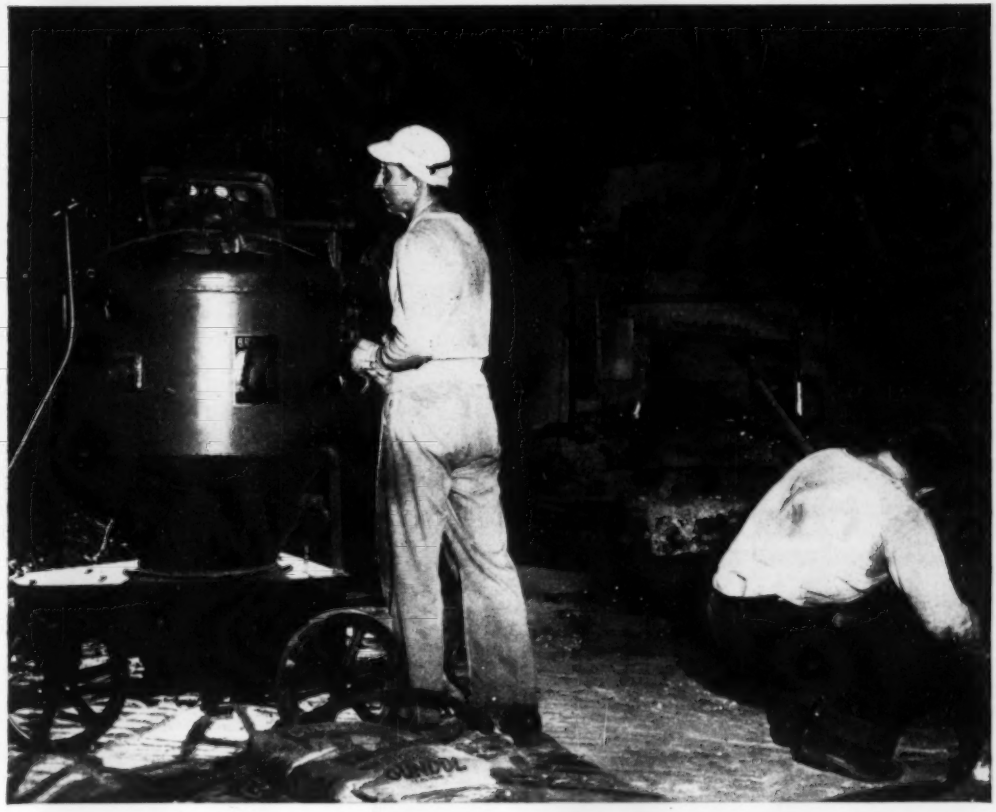
Shrdlu

(Metalworking Outlook—Page 45)



How a prominent tool steel producer cut relining cost $2.10 per heat

THE company that operates this 5-ton electric furnace specializes in fine quality tool steels.

Some months ago the company bought a BRI Gun in order to maintain the sidewalls with Gundol. Formerly the furnace had to be relined about every six weeks. With the BRI Gun, linings have been kept in such good repair that average life has been extended to seven weeks. The twenty-one additional heats per lining have reduced lining cost $2.10 per heat.

At this rate the direct dollar saving will pay for the gun in less than nine months—with the added steel production resulting from less frequent shutdowns providing a dividend on the investment.

Gundol or Gunmix and the BRI Gun—long since found essential for large furnace maintenance—now demonstrate their practical value for smaller furnaces too.

If you operate electric furnaces, regardless of size, the record proves that you can use the BRI Gun and one or more of our gun refractories to advantage.

Basic Refractories Incorporated 845 HANNA BUILDING, CLEVELAND 15, OHIO

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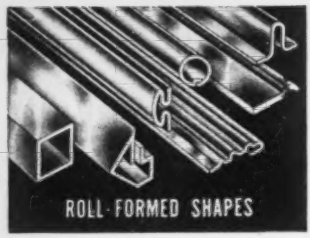

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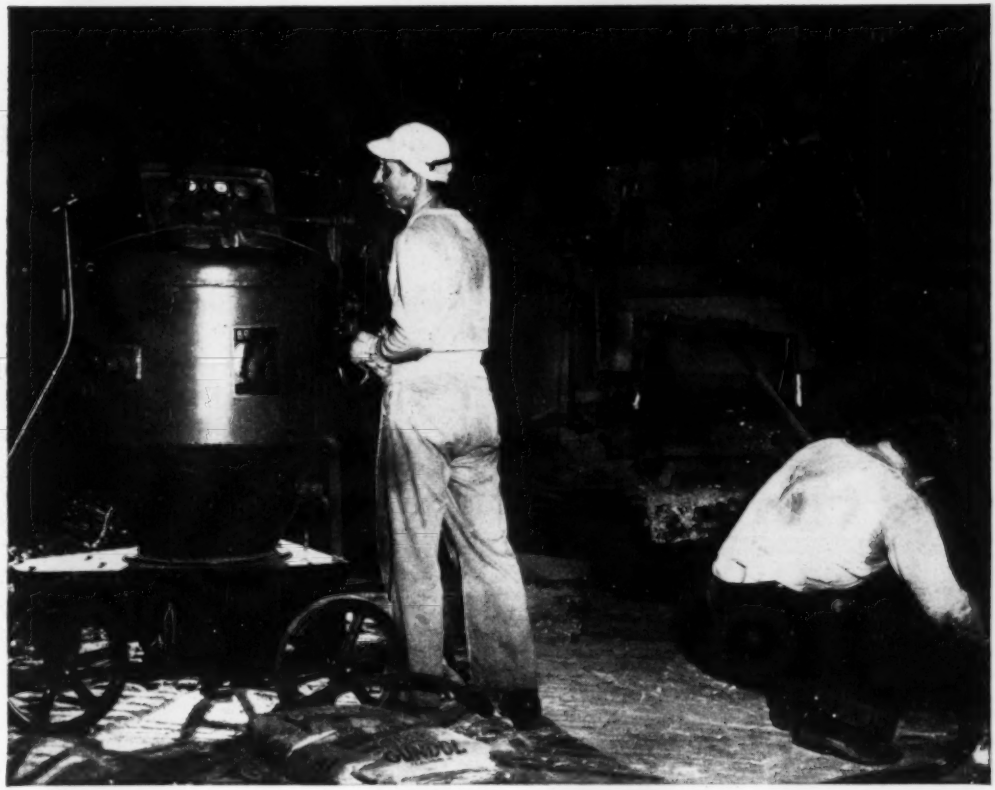

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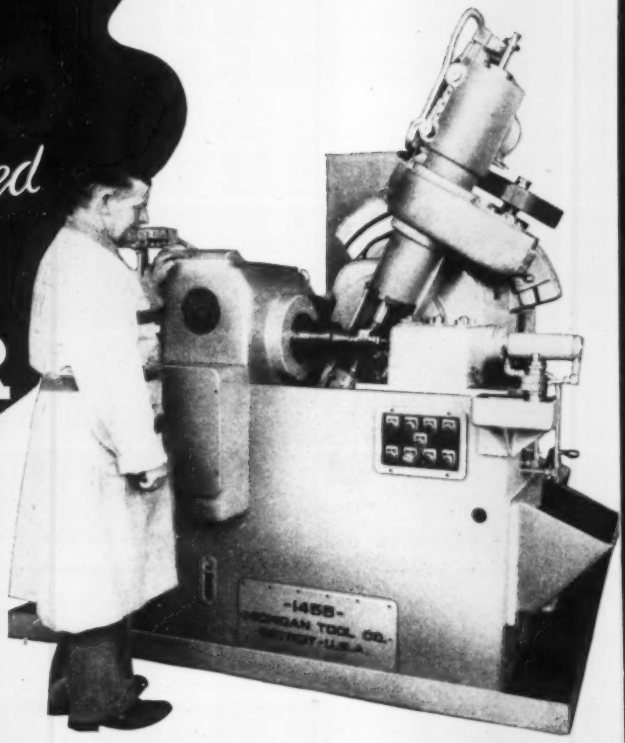
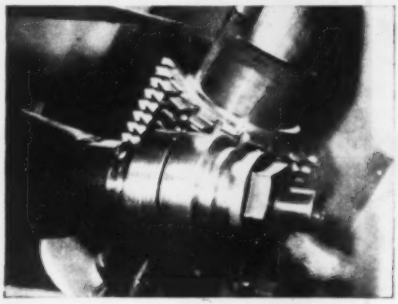
GEAR HOBBER

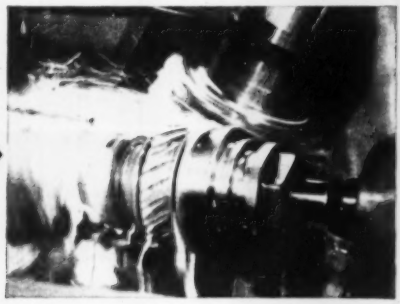


READY TO HOB TWO 3⅛" GEARS



Just before button is pushed to start the cycle.

15 SECONDS LATER



Hob has completed its plunge cut and transverse feed of work starts.

Rounding out its complete line of gear production machines and tools, Michigan Tool is proud to announce successful completion of development and production testing of its spectacular new high-speed, high-production, single-spindle gear hobber—designed to make tomorrow's gear hobber requirements available *today*.

It employs a number of new design and operating principles developed and proven over a period of several years, all of which combine to give the Michigan Gear Hobber output rates which closely approach those of Michigan Underpass gear finishers and "Shear Speed" gear shapers.

For example, the Michigan Gear Hobber can finish-cut two 3⅛" diam. 9 pitch, (2 inch total face width) gears simultaneously to well within pre-shave tolerances, in a matter of 58 seconds, using high speed steel hobs.

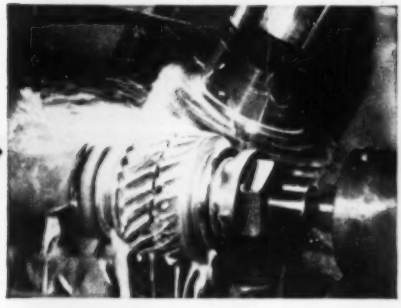
For details, write for
Announcement Bulletin No. 1458A.

- **Enables use of HSS hobs at practically 'carbide' speeds.**
- **Hob speeds up to 1000 rpm or more available, if ever needed. (i. e., 1300 SFPM or more with a 5" hob)**
- **Infinitely variable feeds at touch of a dial.**
- **Gear accuracy virtually independent of machine operation.**
- **Positive hydraulic dual feeds eliminate 2/3 of gears otherwise required.**
- **Plunge feed replaces conventional approach feed; gives shorter total hob travel.**
- **Torsional deflection and vibration eliminated, to all practical purposes.**
- **Designed for push-button pre-selective hob shifting and automatic loading (optional equipment).**
- **Quick positive setup, almost foolproof operation; high versatility.**
- **One operator can easily run two or more machines despite high output rate.**
- **Conforms to all JIC standards.**
- **Rigid and compact.**

MICHIGAN TOOL Company

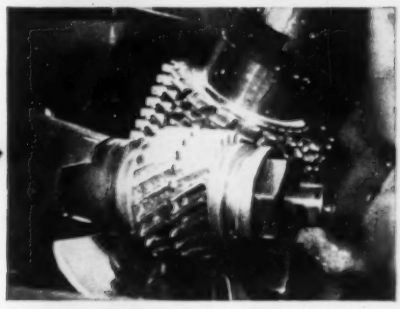
7171 E. McNICHOLS RD. • DETROIT 12, MICHIGAN, U. S. A.

... AT 37 SECONDS



Nearing the end of the climb cut.

FINISHED IN 58 SECONDS



Ready for reloading.

PRODUCTION IMPROVED at International Harvester with Sheffield Precisionaires

The following are actual on-the-job comments from the Fort Wayne Plant, Motor Truck Division of International Harvester where Sheffield Precisionaire gages are on the job.

SUBJECT: Differential carrier reaming operation.

Does air gage and quality control chart help?

FOREMAN: "They enable us to know where we are. Quality is improved, resulting in better pinion cage assembly fit."

OPERATOR: "It's the best thing we ever had. We can see gradual size change and be on guard to know when to change reamers. I have no worry about scrap or rework."

SUBJECT: Ring gear boring operation.

Has air gage and quality control chart been helpful?

FOREMAN: "Scrap was reduced from 3% to practically nothing. Improved method of setting boring tool and redesigned facing tool were developed. Air gage check is much faster than old method."

OPERATOR: "We know where we are all the time."

For more information about Precisionaires, other Sheffield products and services write to "Customer Consultation."

5834

the *Sheffield* corporation

Dayton 1, Ohio, U. S. A.

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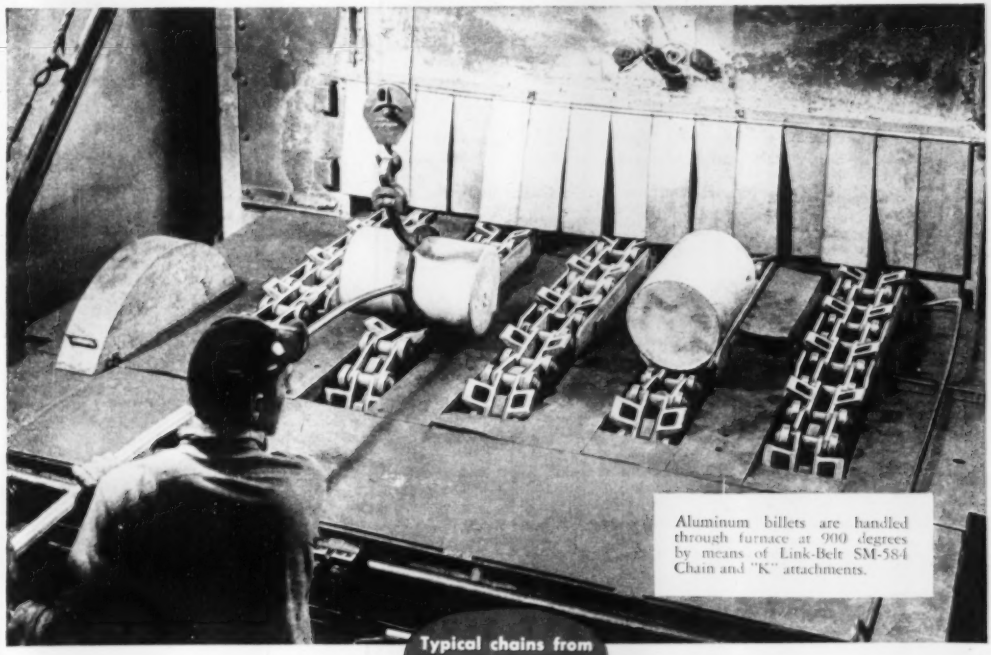
LINK-BELT

CHAINS AND SPROCKETS



Aluminum billets are handled through furnace at 900 degrees by means of Link-Belt SM-584 Chain and "K" attachments.

Typical chains from the complete LINK-BELT line

Class SS bushed roller chain with straight sidebars —for practically any conveying or elevating service.

Class C combination chain — popular, durable, low cost design for elevators, conveyors.

Class SS bushed roller chain with offset sidebars —for heavy drive service at moderate speeds.

Transfer chain with tilting dogs—for plate and slab travel, loads up to 300,000 pounds.

"LOOK HOW RUDOLPH'S OUTPUT HAS INCREASED SINCE THEY CHANGED TO THE RIGHT CUTTING FLUID!"

THE BEST MACHINE and the finest operator cannot do the best work without that irreplaceable essential — the *right* cutting fluid. Seldom is there more than one cutting fluid that is exactly *right* for the job — with which it may be done faster and better, or both.

Stuart combines theory and practice to give you the right cutting fluid for the job. Here is an example:

In a large gear department, cutting fluid tests were run on Gleason Revacycles cutting 8620 gear stock, 179 Brinnel hardness.

	"X" Oil	Stuart's SPEEDKUT "A"
Gears Per Tool Grind.....	1200	3200
Stock Removal to Recondition Cutters	.009"	.0035"
Price of Cutting Oil.....	33c/gal.	35c/gal.

There's a story! More production because of less downtime. Longer cutter life because of fewer grinds and less stock removal per grind. A lower *actual cost* for the cutting fluid.

You can get help like this from a Stuart Representative. Ask to have him call.

Are you receiving Stuart's Shop Notebook regularly? Write, wire or phone

GET MORE PRODUCTION
Use The Right Cutting Fluid

STUART SERVICE
Goes with every Barrel
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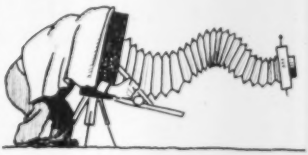
LETTERS
TO THE EDITORS

Focus on Engineers



Enjoyed very much reading your article "Need Engineers?" in the Oct. 22 issue of STEEL. The article is one of the most reasonable, straightforward and objective statements I've read on the subject. You are to be commended on this important step of bringing into focus the difference between the "wholesale" and "retail" approach to engineering manpower utilization.

Ralph P. Sollott, director
manpower utilization
Office of the Assistant Secretary of Defense
Washington

. . . my compliments on a good piece of work which needed to be done and which you have done admirably.

Henry H. Armsby
associate chief for engineering education
Federal Security Agency, Office of Education
Washington

Made in Cleveland

On p. 93 of the Nov. 5 issue of STEEL, you have an article "Pure Borides." Can you tell us who supplies this material in commercial quantities?

W. J. Loach, manager
research and development division
Firth Sterling Steel & Carbide Corp.
Pittsburgh

• *The supplier of pure borides is Cooper Metallurgical Associates, Cleveland.*

For Easy Reference

We have found your guide on the Controlled Materials Plan to be an easy reference and instruction medium in promoting understanding of CMP. May we have additional copies for distribution to our key men?

F. Wright, general foreman
material handling, Chevrolet-Los Angeles Div.
General Motors Corp.
Van Nuys, Calif.

Good Argument

Your article on p. 70, STEEL, July 16 ("Watch Packaging Specs in Figuring Military Contracts"), was a revelation to me and ammunition for my work.

On several occasions different departments in our company have been thinking of export processing our material here in our shop. I have been stalling them off with every form of argument. Now your article and especially the last paragraph (Give it to an expert.) is the best I have read on the subject.

Would it be possible to get reprints of this article?

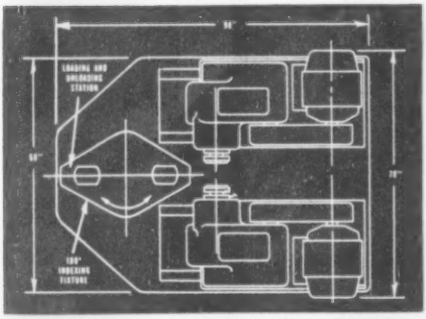
J. R. Kuprewicz, sales department
E. L. Wiegand Co.
Pittsburgh

• *They're being sent.*

A New Concept- DUPLEX PRODUCTION Milling Machines as Developed by MOTCH & MERRYWEATHER

Great power and rigidity are transmitted at the tool point. Right-hand and left-hand milling heads rapid traverse approach, feed, and rapid return. The rotary index table carries two sets of workholding fixtures and is positively locked at the milling station. Here is the essence of rigidity.

M. & M. Duplex Production milling machines fit easily into conveyorized production lines. Parts are loaded and removed at one station. Production: 268 tractor side bars per hour at 100%.



Drawing above shows general design of Motch & Merryweather Duplex Production Milling Machine.

With this Motch & Merryweather single-purpose production milling machine the two heads move, not the operator. There is no milling table to move. Let us tell you why greater rigidity and power (30 h. p.) will jump your production. Fixtures can be changed within certain limitations to suit your requirements. Your part drawings will receive our prompt attention.

Manufactured by

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
715 PENTON BUILDING • CLEVELAND 13, OHIO
Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT

At Western Brass Mills, too,

One hundred mill runs daily to produce "tailormade" brass, copper, bronze and nickel alloy sheet and strip—that's the job assigned to rugged Bliss four-high mills at Western Brass Mills. Equipped with precision controls and adjustments to speed changeovers, Bliss mills work round the clock at Western plants in East Alton, Illinois and New Haven, Connecticut, delivering smooth-surfaced sheet and strip, true to gauge.

Performance-tested material-handling devices specially engineered by Bliss for Western Brass Mills, a division of Olin Industries, Inc., include payoff reels, coil entry conveyors, sticker guides, tension reels, roller conveyors, Billy rolls, coil hoists and many others.

Your metal production, ferrous or non-ferrous, may benefit from new Bliss equipment—rolling mills and accessories, hot or cold. There's a good chance that Bliss engineers, who created many of the metal-producing industry's "firsts," will have the right answer for you.

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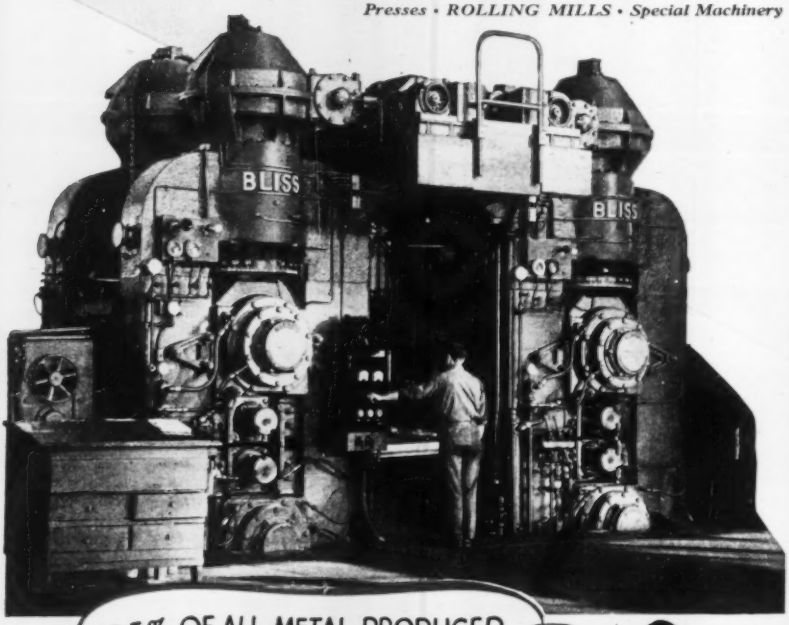
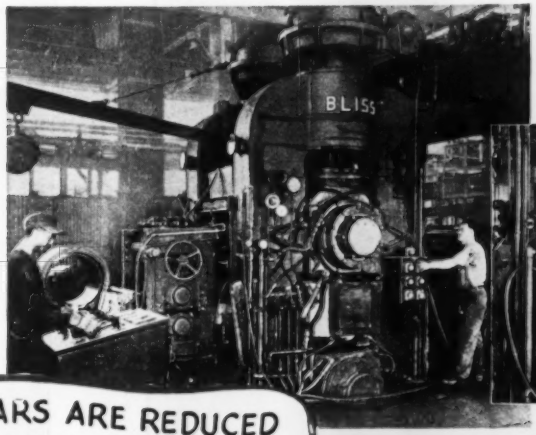
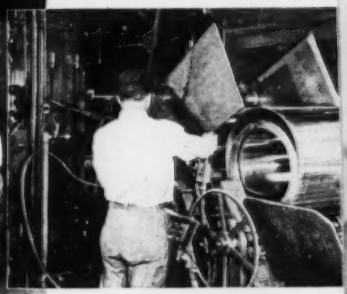


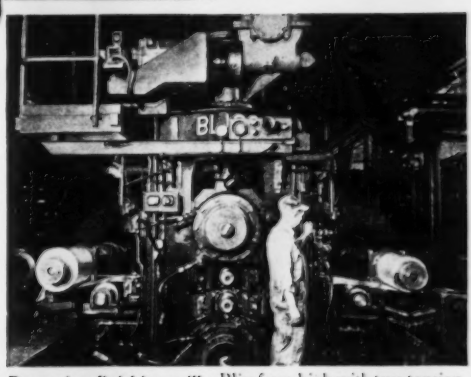
95% OF ALL METAL PRODUCED HERE AT EAST ALTON PASSES THROUGH THIS TANDEM MILL

Bliss Meets Exacting Standards

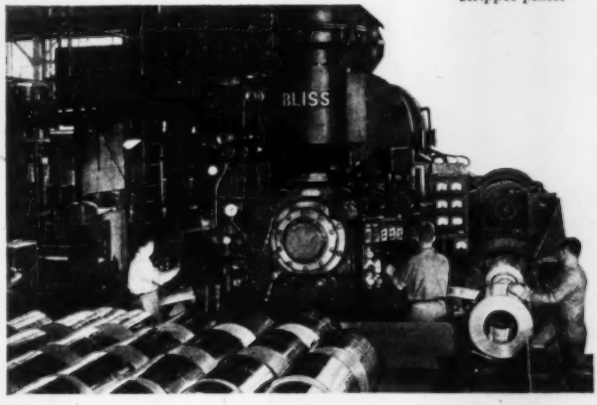


Bliss Coiler coils metal on the *first* pass at .365".

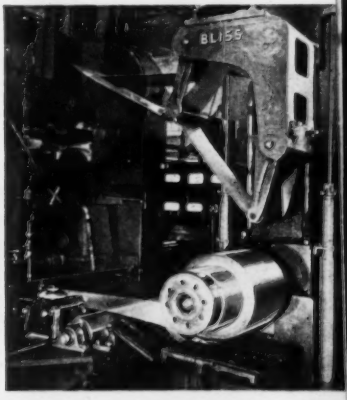




Reversing finishing mill—Bliss four-high with two tension reels, Billy rolls, coil hoists with V-type conveyor rolls and stripper plate.



Finish rolling brass strip—this Bliss four-high mill 12" x 34" x 34" has pay-off reel (left) and tension reel (right), V-type roller conveyor and coil transfer.



Tension reel with belt wrapper for heavy and light gauge coils illustrates equipment for efficient handling.

Take Note

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is now available

Made by skilled craftsmen from Washburn Steel, its uniformly superior quality insures the dependability of your springs. . . . Famous for years.

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TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

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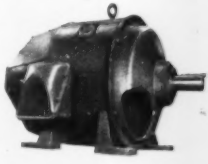
Top Speed Production!

For almost half a century, Reliance Application Engineering in the field of motor drives and associated controls and regulators has served every industry. Today, electric drives engineered by Reliance are providing the fullest operating flexibility required to realize top speed production at lowest possible cost from all types of machines in all types of processing and converting. In this great diversity of successful applications of drives engineered by Reliance there is tangible, working evidence of the wealth of specialized experience and production "know how" which Reliance engineers are ready to place at *your* disposal. Just call or write the nearest Reliance office. Sales representatives in principal cities.



See three typical examples on the reverse side of this page

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1081 IVANHOE ROAD • CLEVELAND 10, OHIO

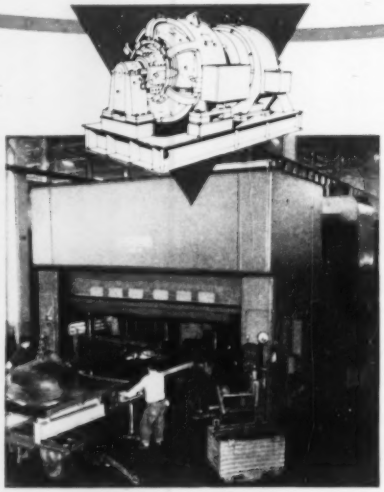
CANADIAN DIVISION: WELLAND, ONTARIO

RELIANCE ELECTRIC AND ENGINEERING COMPANY

Today, after almost 50 years of steady Reliance growth, the two words "AND ENGINEERING" continue to represent specialized engineering services in the application of electric motor-drives to help users achieve the greatest possible production from machines—at the lowest possible cost. Recent examples of typical results when Reliance engineering is applied to specific problems include these interesting applications . . .

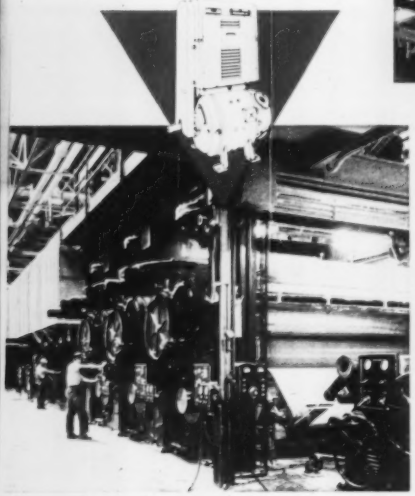
A Paper-Making "First"

First to make and finish paper in one continuous operation, this 154" paper machine at the New York and Pennsylvania Company also applies coating and does the supercalendering. Maintenance of dependable, precise speed relationships between all sections is absolutely essential. It is provided by a Reliance Sectional Paper Machine Drive coordinated by Reliance Section Interlock Regulators (SIR). Here is the simplest, most practical and most economical answer to specialized job requirements—furnished by Reliance Application Engineering.



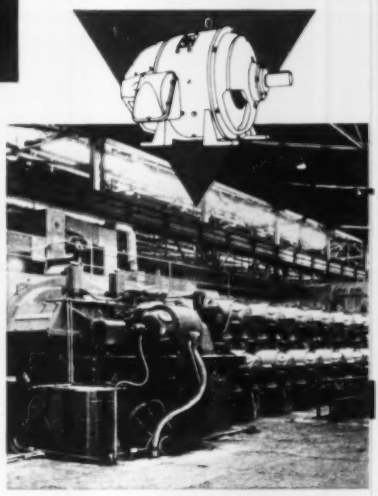
Synchronized Speed

1,000 foot-per-minute peak operating speed makes this new Fretz-Moon Pipe Mill, of the Wheeling Steel Corporation, Benwood, W. Va., the fastest ever built. Such tremendous speed posed a knotty problem in extremely close synchronization between speed of motors driving forming mill and motors driving carriage of flying saw. Reliance application engineers, in close cooperation with the equipment manufacturer, supplied the completely satisfactory answer by the use of Heavy Duty Type 'T' D-c. Motors, Electronic VSR Speed Regulators and M-G Sets.



World's fastest triple-action presses . . . with a big assist from their 500 hp. Adjustable-voltage Drives specially designed and engineered by Reliance! And in the application of drive motors on these huge body presses in the Ford Motor Company's new Buffalo Stamping Plant, electronic controls developed by Reliance research have accomplished other amazing things. These include the saving in production of a substantial amount of steel which was formerly scrapped and reduction of die replacements costs. Reliance M-G Sets power the drive motors in this application which offers abundant proof that soundly-engineered motor-drive is more than power.

World's Fastest



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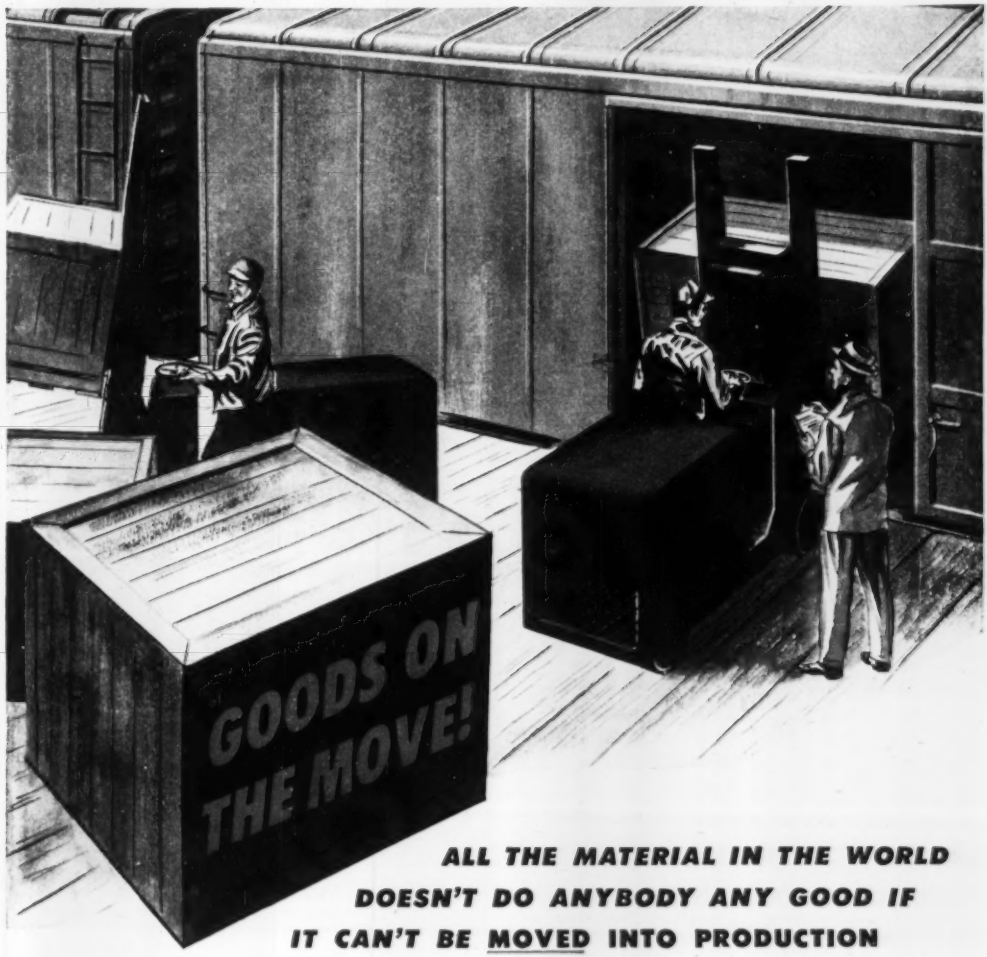
1081 Ivanhoe Road, Cleveland 10, Ohio • ***Sales Representatives in Principal Cities***

CANADIAN DIVISION: WELLAND, ONTARIO



ALL THE MATERIAL IN THE WORLD DOESN'T DO ANYBODY ANY GOOD IF IT CAN'T BE MOVED INTO PRODUCTION

That movement of materials is sped immeasurably by material handling equipment, designed and produced by that alert industry. Thus, hundreds and thousands of tons of products are moved into production *easily, safely, economically.* Much of this tonnage is moved by equipment built, fastened and made stronger with Sterling Bolts and Nuts—because Sterling Bolt products in volume have proved their merit for more than 30 years. This is a matter of record with buyers of bolts and nuts in production quantities.

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INVITATION

TO EVERY USER OF MACHINE TOOLS

Giddings & Lewis' 5-point "Job Analysis Service" takes the guesswork out of buying heavy machine tools . . works for you and with you to solve big or complex machining problems . . increases production . . reduces machining costs

GIDDINGS & LEWIS

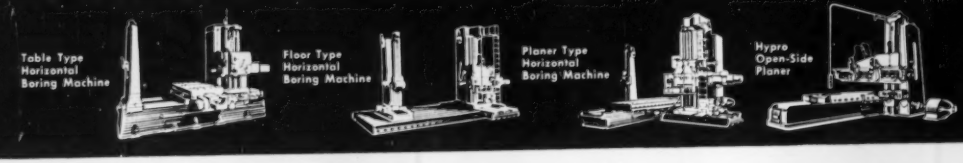


Table Type Horizontal Boring Machine
Floor Type Horizontal Boring Machine
Planer Type Horizontal Boring Machine
Hypro Open-Side Planer

1 **COMPLETE STUDY OF YOUR JOB OR JOBS** G&L Job Analysis Engineers, working with your engineers, analyze your individual job requirements by: (1) number and size of parts to be produced, (2) number and kind of operations needed, (3) tolerances and finishes required.

2 **DETERMINE MOST EFFICIENT MACHINING METHOD** Taking into consideration the individual machining requirements of the job, G&L Job Analysis Engineers choose the most efficient machining method. G&L engineers can give an unbiased opinion because G&L builds a complete line of sizes and types of planers, planer-millers, vertical boring and turning mills and horizontal boring, drilling and milling machines . . . plus a complete line of accessories and tooling for these machines.

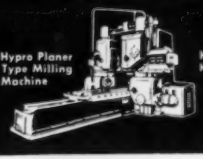
3 **SELECT THE SIZE, KIND AND TYPE OF MACHINE** The machining method now determined, G&L Job Analysis Engineers — using your specific production and work requirements — recommend the exact size, kind and type of machine that will do the job most efficiently.

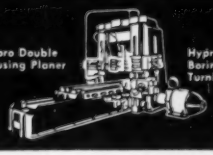
4 **PLAN YOUR OPERATIONS** After the selection of the most efficient machine to fit your needs, G&L Job Analysis Engineers plan a sequence of operations that will (1) minimize number of setups and setup time, (2) use modern cutting tools to best advantage, (3) take full advantage of the machine working ranges and capacities, (4) keep operator fatigue to a minimum.

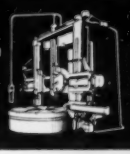
5 **RECOMMEND (AND DESIGN IF NECESSARY) THE TOOLS TO USE** If conditions warrant, G&L will recommend the standard machine accessories, arrangements and tools you can use to make your equipment more productive — more versatile in application. If special equipment is needed, it will be designed to agreed specifications and made a part of your order.

Write G&L or their nearest representative today. Get the facts on your needs — your problems. Get a G&L unbiased Job Analysis to help you. Don't hesitate — there's no obligation . . . AND DELIVERY MAY BE BETTER THAN YOU THINK!

MACHINE TOOL CO.


Hypro Planer Type Milling Machine


Hypro Double Housing Planer


Hypro Vertical Boring and Turning Mill

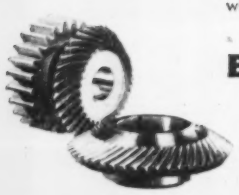
G&L HYPRO

FOND DU LAC
WISCONSIN

at BRAD FOOTE is the art and science which converts gear designs into drawings and specifications of component parts. Here . . . in our own plant . . . our own engineers determine mechanical and metallurgical structures. Our own draftsmen create the intricate, accurate drawings from which other skilled hands make the finished pieces.

• Engineering is important. It is a primary step in BRAD FOOTE'S method of complete manufacturing control. It assures you of gears which will perform satisfactorily . . . when used in your shop or on equipment you sell to others.

• This engineering service we give our customers is another reason why we can say—*"No one shares our responsibility."*



BRAD FOOTE GEAR WORKS, Inc.

BIshop 2-1070 • OLympic 2-7700 • 1309 South Cicero Avenue
Cicero 50, Illinois

Stainless must go a long way, too!

To meet the demands of national defense and civilian needs, stainless must go a long way. That's why, now, more than ever—if you use stainless—use it wisely and efficiently.

Stainless is a name given to a broad list of grades and finishes—therefore, careful selection of the best available materials for your job is of prime importance. Here Crucible, a pioneer in the development of stainless steels, can help you get the most out of your share of stainless stocks through the unparalleled experience of our metallurgists and stainless fabricating specialists.

And when you can't get the grade of stainless you need, Crucible technical personnel can give you sound advice on the best available materials.

Until the time when stainless is more freely available . . . stretch your supplies of stainless. To do this . . . make use of Crucible's wealth of stainless steel experience.

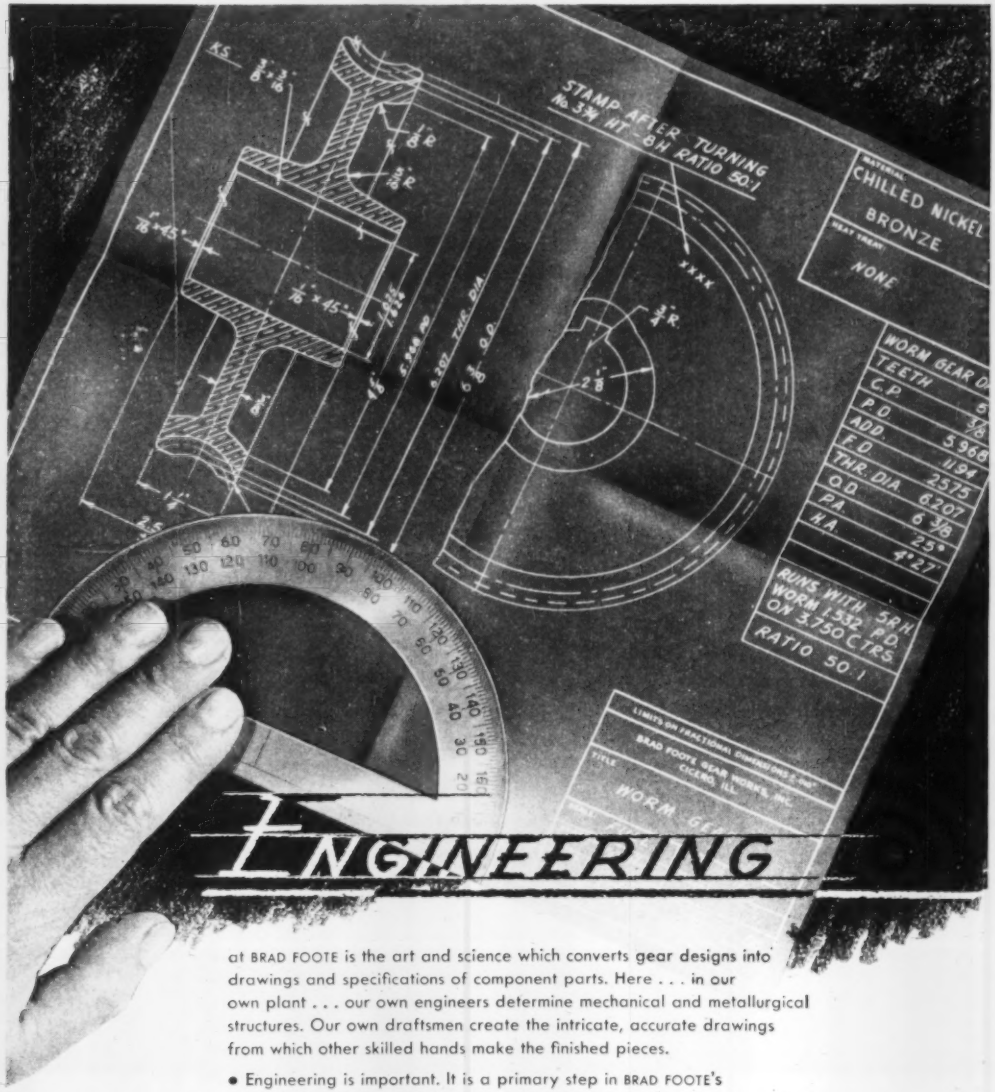
CRUCIBLE first name in special purpose steels

51 *years of* *Fine* *steelmaking*

STAINLESS STEELS

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS



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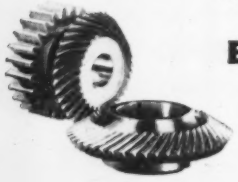

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CRUCIBLE first name in special purpose steels

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STAINLESS STEELS

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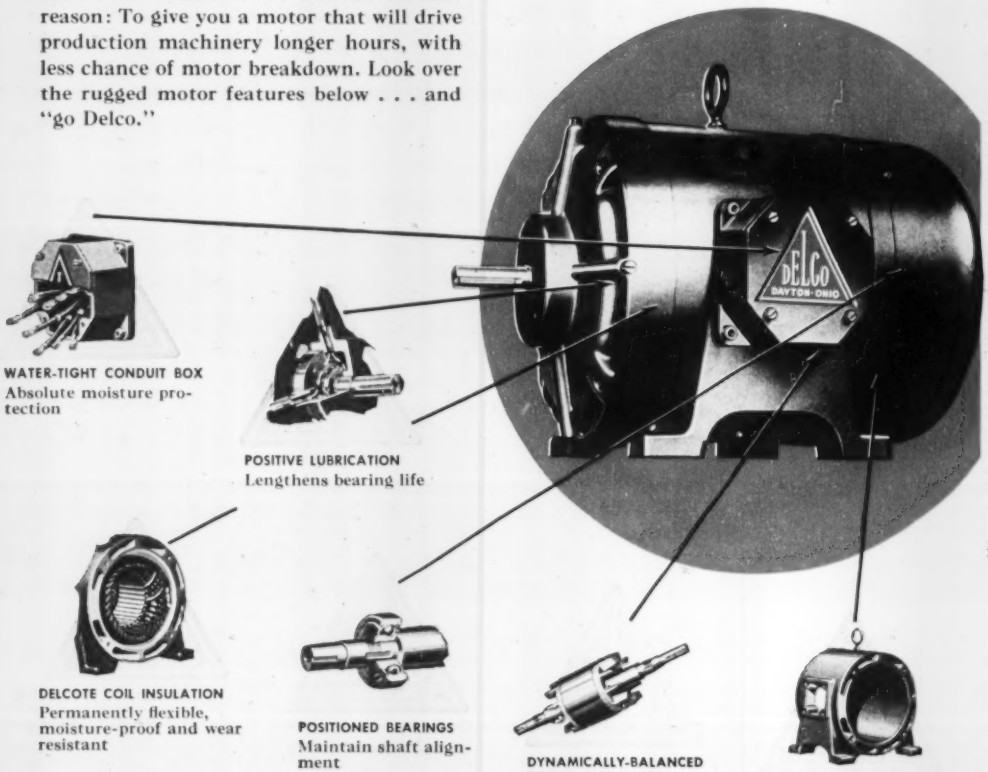
STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

GO DELCO...

give motor trouble the BRUSH OFF

Delco engineering has put a lot of extras into Delco Motors . . . and all for one reason: To give you a motor that will drive production machinery longer hours, with less chance of motor breakdown. Look over the rugged motor features below . . . and "go Delco."



WATER-TIGHT CONDUIT BOX
Absolute moisture protection

POSITIVE LUBRICATION
Lengthens bearing life

DELCOTE COIL INSULATION
Permanently flexible, moisture-proof and wear resistant

POSITIONED BEARINGS
Maintain shaft alignment

DYNAMICALLY-BALANCED ROTOR AND SHAFT ASSEMBLY
Reduces vibration, wear

CORROSIVE-RESISTANT CAST IRON FRAME
More solid, more rugged

"DELCO PREFERRED"
—because Delco Delivers

Open and enclosed motors for most industrial applications in sizes up to 100 horsepower for standard foot mountings. NEMA C&D flange-mounted motors available in sizes through 30 horsepower. Get in touch with Delco Products, Dayton, Ohio . . . or any sales office listed below.

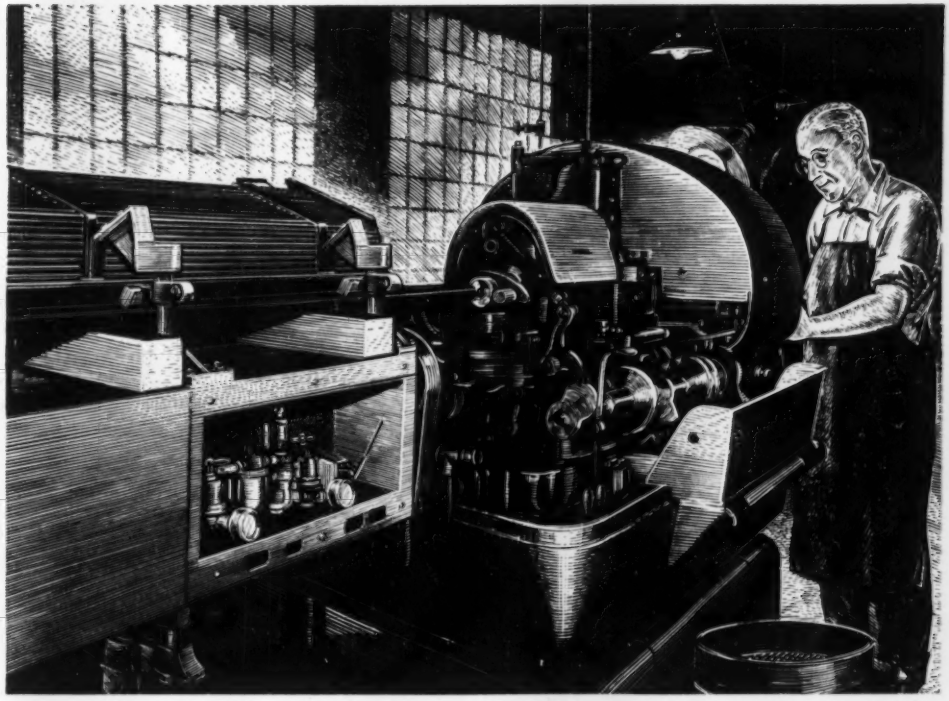
DELCO DAYTON OHIO

DELCO MOTORS

DELCO PRODUCTS
Division of General Motors Corporation, Dayton, Ohio

SALES OFFICES: Chicago • Cincinnati • Cleveland • Dallas • Detroit • Hartford • Philadelphia • St. Louis

ALSO AVAILABLE THROUGH DELCO MOTOR DISTRIBUTORS



Stiffest fabricating demands met by Scovill High-Speed Brass Rod

With production demands rising and brass scarcity continuing, you need *full utilization* from every piece of free-cutting brass rod you fabricate.

That's why you need the unsurpassed *soundness* and *uniformity* of *Scovill High-Speed Brass Rod*...to assure accuracy, eliminate waste, save time and labor. Minimum tool wear when using this rod permits tolerances to be closely held on finished parts.

This rod-to-rod uniformity... in composition, in freedom from internal defects, in free-cutting temper . . . is achieved through Scovill's unique *continuous-casting* process, plus quality-controlled annealing and drawing procedures. *Scovill High-Speed Brass Rod* superiority is also due to straightness, smooth surfaces, clean chamfering, close tolerances, improved packaging.

When you *are* able to get Scovill Brass Mill Products under existing restrictions and controls, you can be sure . . .

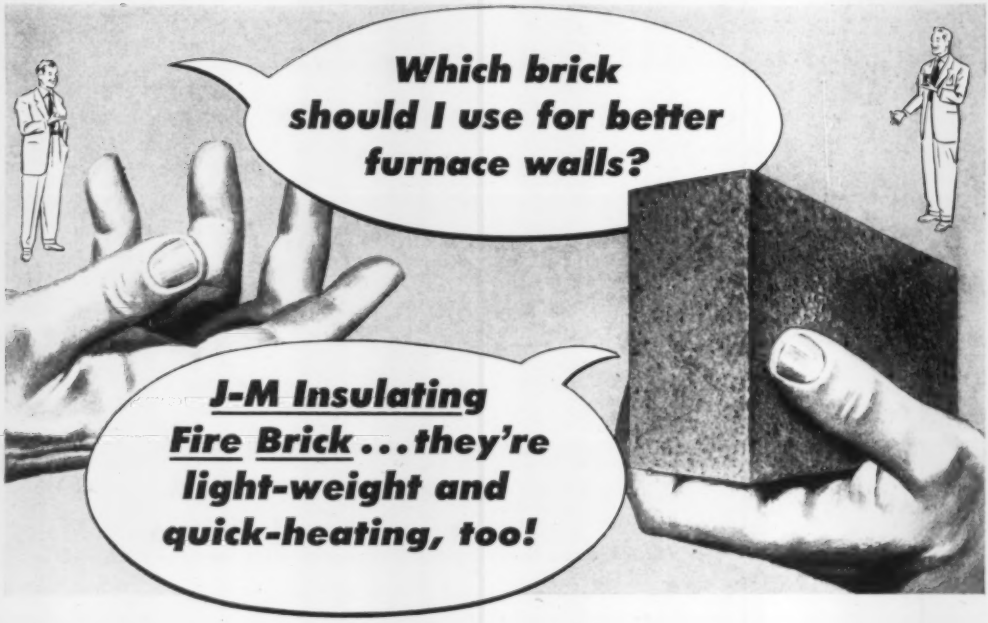
"You can't buy better brass"

SCOVILL

A PRODUCT OF SCOVILL

For complete information, contact: **SCOVILL MANUFACTURING COMPANY,** 83 MILL ST., WATERBURY 20, CONN.

BRASS MILL PRODUCTS IN A COMPREHENSIVE RANGE OF COMMERCIAL ALLOYS, SHAPES, TEMPERS AND SIZES



6 types . . . for savings in services up to 3000F

Because of their quick-heating and low-heat transfer characteristics, Johns-Manville Insulating Fire Brick are efficient fuel-savers for use at operating temperatures up to a full 3000F on the insulation.

Each type of J-M Insulating Fire Brick has the correct balance of thermal and physical properties that assures maximum economies within a specific temperature range. All types are *quick-heating* . . . operating temperatures are reached in a short time, thereby saving fuel.

Identical materials can also be obtained in large size units known as Johns-Manville Insulating Fireblok. Fireblok have the same properties as the brick, but are made in extra large sizes for added construction economies. The large units can be installed faster . . . require fewer joints and less bonding mortar. During rebuilding or repair, furnace down-time is appreciably shortened with Fireblok construction.

A Johns-Manville insulation expert will gladly explain the advantages and economies of using J-M Insulating Fire Brick and Fireblok for refractory linings or as back-up insulation behind other refractory protection. Write to Johns-Manville, Box 290, New York 16, N. Y. In Canada, write 199 Bay St., Toronto 1, Ontario.

Properties	Types of Insulating Fire Brick and Fireblok					
	JM-3000	JM-28	JM-26	JM-23	JM-20	JM-1620
Temperature limit	†3000F	†2800F	†2600F	†2300F	†2000F	‡2000F †1600F
Density, lb per cu ft	63–67	58	48	42	35	29
Transverse strength, psi	200	120	125	120	80	60
Cold crushing strength, psi	40	150	190	170	115	70
Linear shrinkage, percent	*0.8 at 3000F	4.0 at 2800F	1.0 at 2600F	0.3 at 2300F	0.0 at 2000F	0.0 at 2000F
Reversible thermal expansion, percent	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F
Conductivity (Btu in. per sq ft per F per hr at following mean temperatures)						
500F	3.10	2.00	1.92	1.51	0.97	0.77
1000F	3.20	2.50	2.22	1.91	1.22	1.02
1500F	3.35	3.00	2.52	2.31	1.47	1.27
2000F	3.60	3.50	2.82	2.70	1.72	....

*24-hr Simulative Service Panel Test; all others 24-hr soaking period. †Back-up or exposed. ‡Back-up only.

JOHNS MANVILLE JM PRODUCTS **Johns-Manville** *first in* **INSULATIONS**

FLAT SPRING STEEL

No more waiting! Roebling's expanded facilities can meet your needs right now!

PROMPT! FAST! . . . that's the sort of deliveries you can count on now for Roebling high carbon flat mechanical spring steel. For many years Roebling has had one of the largest specialty mills in the country and today's expanded facilities have boosted production to new highs.

Roebling flat spring steel is made as you want it . . . annealed, hard rolled untempered; scaleless tempered; tempered and polished, blue or strawed. And from open hearth to finished product, Roebling positive control assures uniform quality . . . saves preparation time for users . . . brings faster, smoother production.

Roebling is ready to furnish flat spring steel with the exact mechanical properties required for any special type of application. Write or wire now for full information. John A. Roebling's Sons Company, Trenton 2, New Jersey.

ROEBLING

Atlanta, 934 Avon Ave ★ ***Boston,*** 51 Sleeper St ★ ***Chicago,*** 5525 W. Roosevelt Rd ★ ***Cincinnati,*** 3253 Fredonia Ave ★ ***Cleveland,*** 701 St. Clair Ave, N.E. ★ ***Denver,*** 4801 Jackson St ★ ***Detroit,*** 915 Fisher Building ★ ***Houston,*** 6216 Navigation Blvd ★ ***Los Angeles,*** 216 S. Alameda St ★ ***New York,*** 19 Rector St ★ ***Odessa, Texas,*** 1920 E. 2nd St ★ ***Philadelphia,*** 230 Vine St ★ ***San Francisco,*** 1740 17th St ★ ***Seattle,*** 900 1st Ave, S. ★ ***Tulsa,*** 321 N. Cheyenne St ★ Export Sales Office, ***Trenton, N. J.***

COMPARISON PROVES the VALUE of VEELOS

the Adjustable V-Belt...

IF you use v-belts you'll be interested in this clear statement of facts about VEELOS, the link v-belt, and endless v-belts.

These 4 reels of Veelos provide up to 316 standard v-belt sizes.

COMPARISON TABLE
VEELOS and ENDLESS V-BELTS

what about...	Veelos V-Belts	Endless V-Belts
ADJUSTABILITY	*Any* length can be provided for *any* v-belt drive due to link construction.	Standard or special lengths must be supplied for *individual* drives.
INVENTORY	MINIMUM INVENTORY. 4 reels can care for every v-belt need in the O, A, B and C widths. No deterioration or obsolescence of spare belts.	LARGE INVENTORY. 316 sizes are required to provide a *complete* stock in the O, A, B and C widths. Spare belts not immediately used will age and deteriorate.
STOCKROOM STORAGE	SMALL SPACE. It takes less than 2 square feet of wall or floor space to store 4 reels of easily identified Veelos.	LARGE SPACE. Walls and ceilings are often covered with stocks of endless v-belts. Identifying and maintaining full stocks is difficult and costly.
INSTALLATION	Installs quickly *on any drive* without resetting motor or tearing down outboard bearings.	Necessary to reset motor and tear down drives with outboard bearings.
MAINTENANCE	Belts can be adjusted or replaced without moving the motor.	Sliding or pivoted motor bases are necessary to replace endless v-belts. Belts cannot be adjusted individually.
OPERATING EFFICIENCY	Full power delivery can be maintained because the tension of each belt in a matched set is kept uniform by removing or adding links.	Individual belts cannot be adjusted to maintain uniform tension and provide full power delivery.
DRIVE LAYOUT	No limitations are imposed by belt length.	Limited by the availability of standard or special belt lengths.

If you would like to learn more about Veelos—how it can save you money and keep your machines producing—write today for your copy of the Veelos Data Book. It's free and full of facts!

MANHEIM MANUFACTURING & BELTING COMPANY
MANHEIM, PENNSYLVANIA

VEELOS THE LINK V-BELT

... ADJUSTABLE TO ANY LENGTH ... ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof and static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

TRANTINYL

GUIDES THE STEEL INDUSTRY

ROLLING MILL GUIDES
and GUIDE ROLLERS
for BAR, HOOP, STRIP
and SHAPE MILLS

Production · Quality · Yield

Youngstown Alloy Casting Corp.
Youngstown, Ohio

SAVE SHOP LABOR SHOP TIME GRINDING COSTS

ELIMINATE THE GRINDING OPERATION ON YOUR STEEL BARS WITH

GROUND and POLISHED STRESSPROOF.

SEVERELY COLD-WORKED FURNACE-TREATED STEEL BARS

STRESSPROOF PROVIDES 4 QUALITIES IN 1 BAR

1. Eliminates Heat Treating

Its *in-the-bar* strength, as received, is twice as great as ordinary cold-finished steel shafting.

2. Eliminates Case Hardening

Its resistance to wear, as machined, is sufficient to replace many heat-treated or carburized steels.

3. Minimizes Warpage

Because it is *stress-relieved*, this superior bar assures the user a minimum of distortion.

4. Speeds Up Machining

Has *in-the-bar* machinability fully 50% better than heat-treated alloys of the same hardness.

Many companies are realizing important savings by using Ground and Polished STRESSPROOF bars instead of grinding the steel in their own shop. For this superior steel provides precision tolerances at a reasonable cost, without tying up valuable labor and machinery.

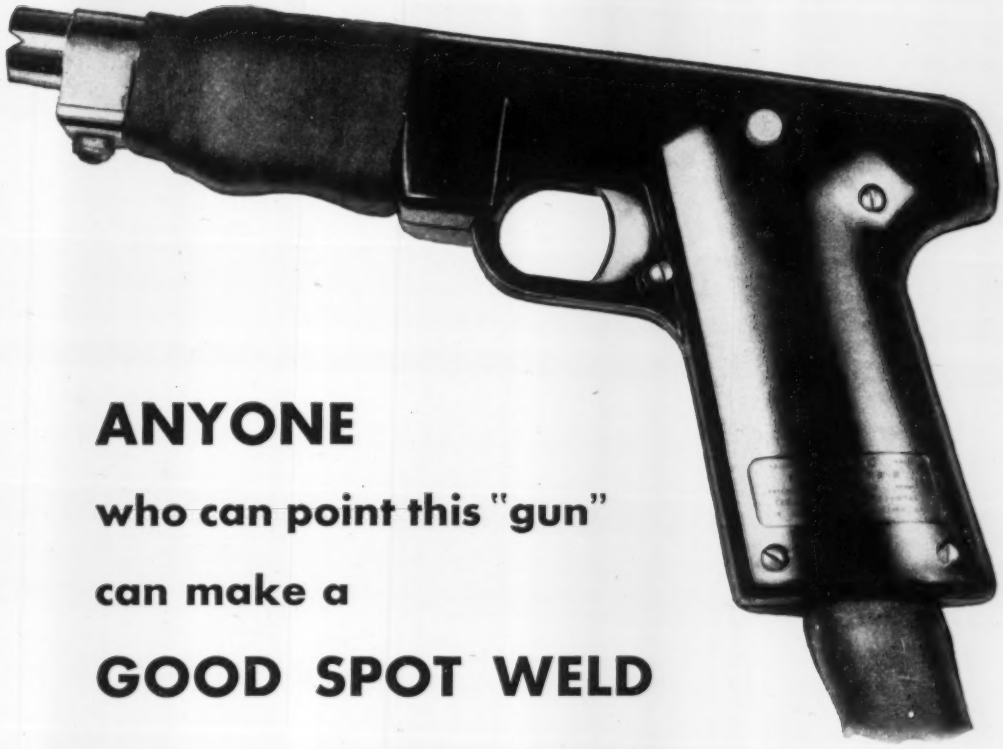
This all-purpose bar stock is ground to close tolerance and highly polished at the LaSalle plant on batteries of modern machines — at lower cost than you can grind it yourself. Furthermore, because this versatile steel is stress-relieved, it requires no straightening after keyseating, journaling, threading, or other machining operations. And its four qualities in-the-bar eliminate many other costly operations.

Almost all of today's Ground and Polished STRESSPROOF production is going into defense jobs. However, from time to time, some sizes of sample bars may be available for testing purposes.

LaSalle STEEL CO.

1414 150th Street, Hammond, Indiana

Manufacturer of the Most Complete Line of Carbon and Alloy Cold-Finished and Ground and Polished Bars in America.



ANYONE

who can point this "gun"

can make a

GOOD SPOT WELD

"HELIARC" HW-8 Pistol-Grip Torch needs no forging pressure...works from one side of sheet...spot welds both STAINLESS and CARBON STEELS

Are you using light gage metals to fabricate large assemblies or irregular shapes? If so, chances are you can simplify many of your joining problems, boost production, and cut costs, too, by spot welding with the HELIARC HW-8 Torch.

The HW-8 joins mild steel, low alloy, or stainless steel .020 to .064 in. thick at one to two seconds per weld. Because it works *from one side of the sheet*, without forging pressure, it makes an easy, one-hand job of spot welding — even in places where resistance welding is not practical or possible.

Connected to a suitable power source with auxiliary timer, the HELIARC Spot Welding Torch makes inert gas shielded welds without fumes, smoke, or spatter. Since operation is automatically controlled, workmen on the assembly line need only press the "muzzle" of the "gun" against the work and pull the trigger. A single hose assembly permits free use of the torch over a 25-ft. radius.

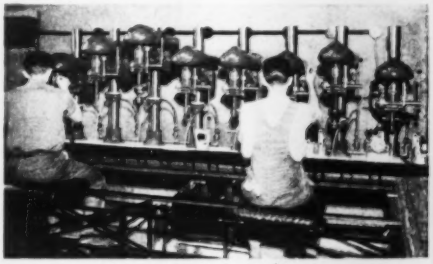
For further information, telephone or write today. LINDE AIR PRODUCTS COMPANY, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y.

The term "Heliarc" is a registered trade-mark of Union Carbide and Carbon Corporation.

Linde Trade-Mark

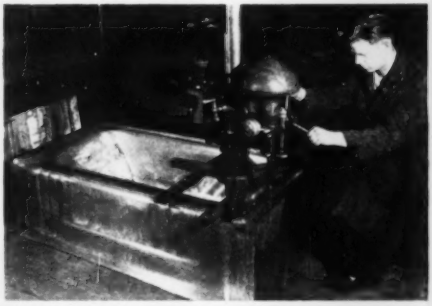
Products and Processes for MAKING, CUTTING, JOINING, TREATING, and FORMING METALS

3 Simple "Moves" Show How VERSATILE DELTA TOOLS Solve Production Problems...



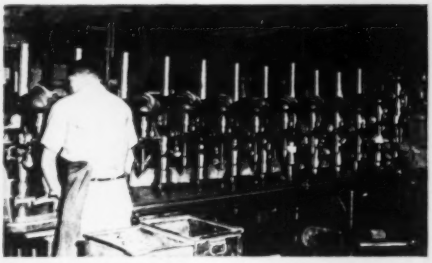
1 MOVE THE OPERATOR

To make it easy for the operators of a long-table multiple spindle Delta drill press to move from one work station to another, Albertson and Company, Sioux City, Iowa, devised roller seats that travel on rails. When one man completes his series of operations he passes the work to the next man. Operators can travel the full length of the table with a minimum of fatigue.



2 MOVE THE TOOL

To make easier work of drilling holes in a large, extremely heavy bath-tub casting, Racine Pattern Works, Racine, Wisconsin, mounted a Delta 17-inch drill press on a three-legged spider base, in place of the regular base. Now the casting remains stationary, and it is an easy, simple operation to slide the drill press into several positions for drilling holes in the flange of the casting.



3 MOVE THE WORK

To speed up eleven operations on an aluminum grid casting—including drilling, reaming, counterboring, countersinking—Sangamo Electric Co., Springfield, Ill., uses a Delta 15-foot sectional table and eleven Delta 17-inch drill presses for the individual operations. The casting moves from one machine to the next; and a great deal of costly trucking and handling is eliminated.

These applications are typical of the cost-cutting set-ups devised by Delta users; and illustrate the extraordinary adaptability of Delta tools to unusual production needs.

There's a Delta Power Tool for Your Job – WOOD OR METAL WORKING

53 MACHINES—246 MODELS—MORE THAN 1300 ACCESSORIES

Your Delta dealer is listed in your Classified Phone Directory under "Tools"

DELTA MILWAUKEE

ROCKWELL

DELTA POWER TOOL DIVISION

Rockwell MANUFACTURING COMPANY

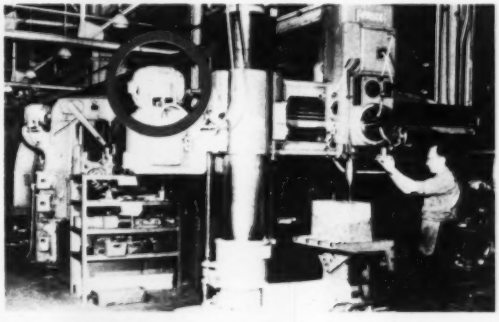
629M E. VIENNA AVENUE • MILWAUKEE 1, WISCONSIN

"We have three shifts in operation," says Julius J. Domonkos, Vice-President in Charge of Manufacturing, Bell Aircraft Corporation. "That's full production on a 24-hour day basis. For the past 10 years we've been depending on Tri-Clad motors to carry the load. We've never regretted putting our confidence in this fine motor!"

G-E Tri-Clad Motors drive the machines that are instrumental in producing helicopters, guided missiles, rocket motors, research aircraft, and jet aircraft engine nacelles for our rapidly expanding armed forces. At Bell Aircraft Corporation, G-E Tri-Clads are known as a thoroughly dependable motor —tough on the outside . . . on the inside . . . at the bearings.

BELL AIRCRAFT CORPORATION:

"We've been depending on Tri-Clad* Motors for Ten Years . . ."



This Tri-Clad driven radial drill takes care of most of the large dies for the entire Bell plant. Big dies and bolster plates are drilled and tapped on this machine, a critical part of the Bell operation. Despite continuous use, plant personnel can't remember a single interruption due to Tri-Clad failure!

*Reg. trademark of General Electric Co.

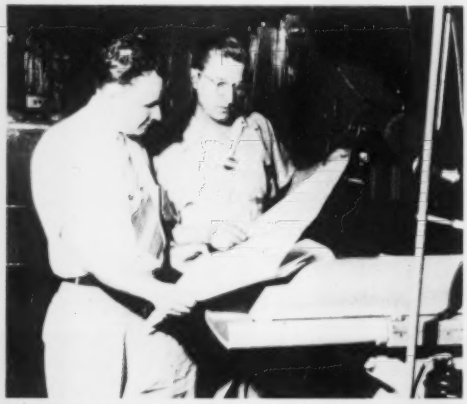
FASTEST BOMBER IN THE WORLD! Jet engine nacelles for the 600-plus miles-per-hour B-47 are being produced at a record-breaking clip in the Bell plant at Buffalo, N. Y. The "Stratojets" represent a major advance in bombardment aircraft.

GENERAL ELECTRIC

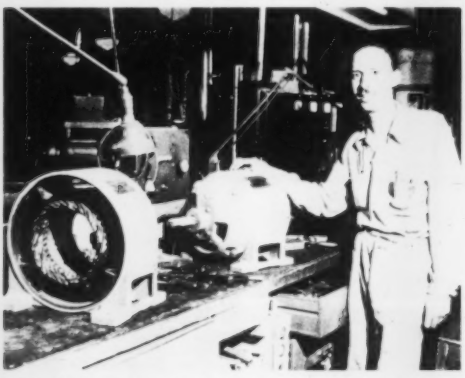
TRI CLAD MOTORS

REG U.S. PAT. OFF.

Help keep Bell Aircraft production up!



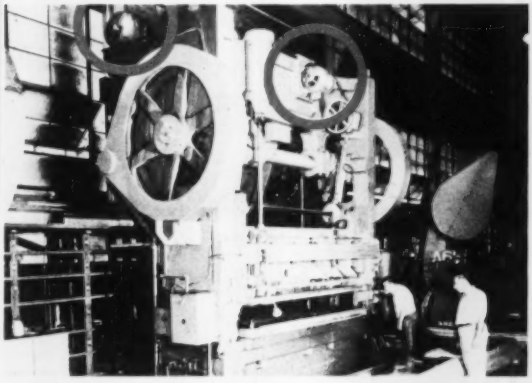
Marvin Limburg (left), Foreman of Bell's Tool and Die Shop, comments, "I don't believe we've ever lost machine time due to breakdown of Tri-Clad motors. And our jig-borers, for example *have been operating around the clock for the last 8 to 10 years.*"



"It's the easiest motor we have to maintain" according to Maxwell Anderson, Crew Chief of Bell's motor repairmen. "There's more working room inside and more room in the slots. It's become a byword with us that if you give a Tri-Clad motor ordinary care you'll never have to worry about maintenance."

TIMELY READING—With every electric motor needed on the line, you'll want a copy of the G-E manual on "How to Maintain Motors and Generators." It's free; just ask for bulletin GET-1202. *Sect. 752-10, General Electric Company, Schenectady 5, N. Y.*

Greasing isn't necessary on a Tri-Clad motor in normal service, but it's always reassuring to know that you *can* lubricate if you so desire, without time-consuming disassembly. The photo shows how easy it is: remove relief plug, attach the grease gun nozzle, squirt—the job is finished.



This huge punch press is an important tool maker. Anton Geiser (right), assistant punch press foreman, says: "I can't recall a single shutdown of this section due to motor failure." Almost all motors in this department are Tri-Clad. This is another Bell Department which has been operating around the clock; cannot afford to lose time because of motor breakdown.

NEW! A Helpful Training Course on Motors!

Everyone concerned with technical training problems will want this new G-E Motor Selection and Application Course. Consists of 9 short, easily understood lessons. Complete kit—slide films, review booklets and instructor's manual—$100.00. Call or write your nearest G-E sales office.

Look at the Scope of this Course

1. Fundamentals of Motors
2. Types of Motors
3. Fundamentals of Selection
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GENERAL ELECTRIC

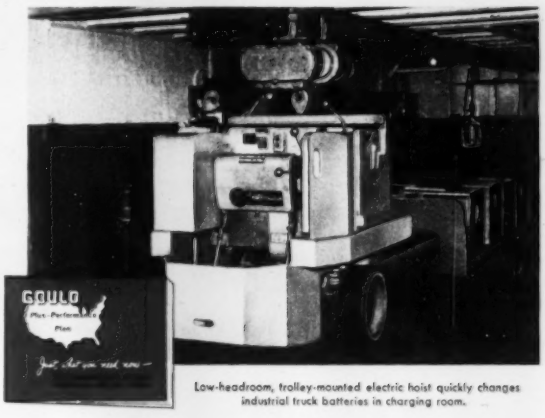
GOULD

Plus-Performance Plan

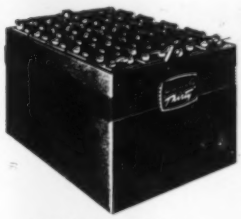
. . . SHOWS YOU WAYS TO HANDLE BATTERIES IN YOUR PLANT

Proper planning of the battery charging room is vital to greatest battery efficiency and the maintenance of high volume production at lowest cost. That's why the GOULD PLUS-PERFORMANCE PLAN contains extensive information on the charging and handling of batteries. This material, together with manuals, articles, specifications, bulletins, record cards, charts and graphs covering every phase of battery care, is yours for the asking.

With the GOULD PLUS-PERFORMANCE PLAN, you have at your fingertips a complete file of technical information on how to select, charge and handle, maintain and determine the condition of your batteries. Use it and battery service can be increased as much as 50%. Send today for the booklet shown at the right.



Low-headroom, trolley-mounted electric hoist quickly changes industrial truck batteries in charging room.



Gould "Thirty" with "Z" Plates—
America's Finest
Industrial Truck Battery

TRAVELLING HOISTS SPEED BATTERY CHANGES, INCREASE EFFICIENCY, CUT ACCIDENTS

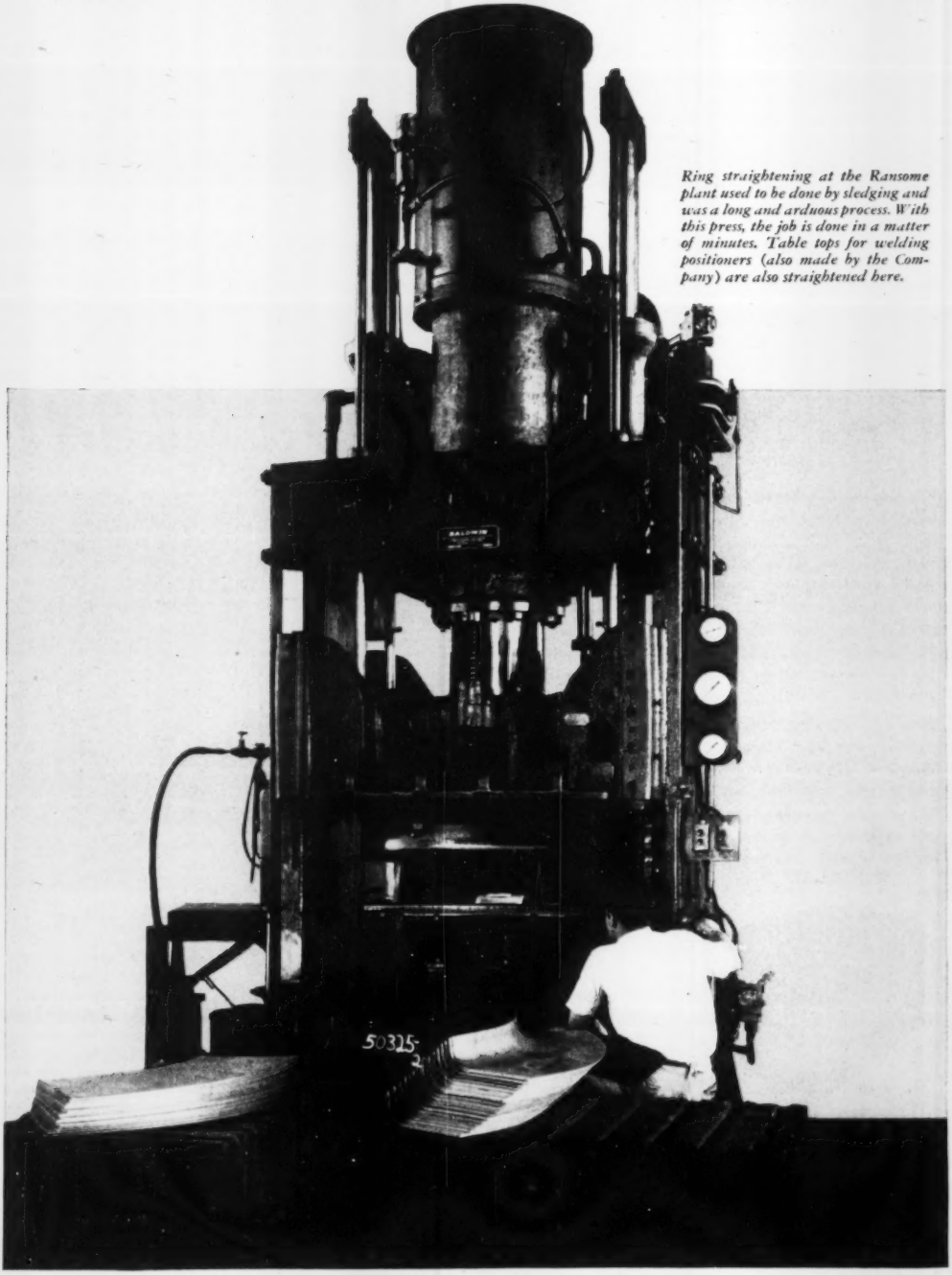
A well planned centralized or decentralized battery charging system with cranes, hoists, battery racks, rollers, etc., located to expedite handling operations is essential to maximum battery service and plant operating efficiency. The illustration above shows such an installation in a Connecticut steel plant. It is unique in that it was fitted into a small, low alcove 15 feet wide, 25 feet long and only 8 feet high. In this space are seven charging units, two transformers, two spare batteries, a rack for simultaneously charging seven 15-cell batteries, space for charging four 6-cell batteries and equipment for lifting, watering and testing. To save headroom, a special pickup attachment is secured directly to the hoist pulley housing. This layout eliminates manual handling operations, simplifies battery maintenance and results in greatly added battery life. Details and other handling suggestions are contained in GOULD PLUS-PERFORMANCE PLAN material.

GOULD **STORAGE BATTERIES**

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

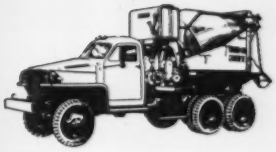
Always Use Gould-National Automobile and Truck Batteries

How the "Ransome" became an



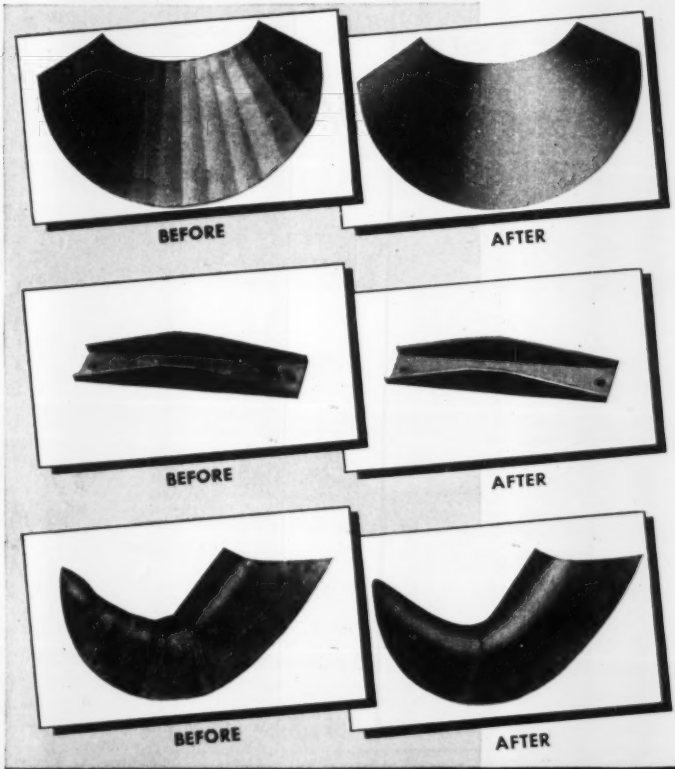
Ring straightening at the Ransome plant used to be done by sledging and was a long and arduous process. With this press, the job is done in a matter of minutes. Table tops for welding positioners (also made by the Company) are also straightened here.

even better mixer with BALDWIN HYDRAULIC PRESSES



On highway and construction projects everywhere you'll see Ransome "Blue Brute" concrete equipment —dual and single drum pavers, "Hi-up" truck mixers and agitators, large stationary mixers and smaller portable mixers. Intent on continuously improving its equipment and faced—like all manufacturers—with the necessity of reducing costs, Ransome attacked these twin problems by installing a Baldwin Hydraulic Press. The reduction in production operations and the improvement in results are indicated by the typical examples shown.

Baldwin Hydraulic Presses are helping manufacturers in many lines to make better products, at higher speed and at lower cost. If you look, you can probably find places in your factory where a Baldwin press could serve you. If you would like to see a Baldwin representative, please get in touch with the nearest Baldwin office.



BEFORE—*Discharge chutes of various types and sizes were formed on a brake, by as many as 30 separate operations.*

AFTER—*The sheared blank is placed on a die and formed to smooth, exact shape in a single operation.*

BEFORE—*Drum door holddown plates were formed on a brake in two operations.*

AFTER—*The holddown plates are formed on the press with one stroke of the ram.*

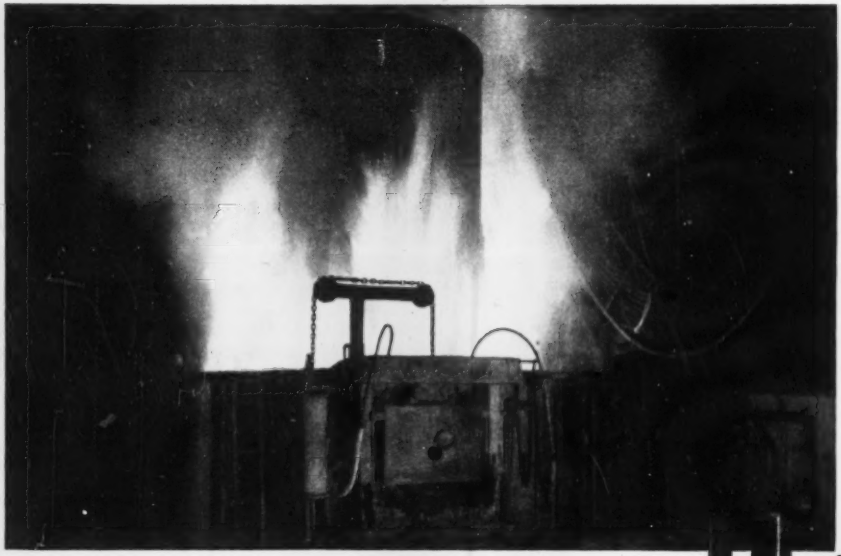
BEFORE—*Individual sheared segments were bent, assembled in a jig and welded. Each weld left a "dam" to obstruct the smooth flow of concrete.*

AFTER—*Long sections of the discharge blades are formed in one operation. In addition to cost reduction, the unobstructed floor means better product performance.*

BALDWIN BLH LIMA-HAMILTON

BALDWIN-LIMA-HAMILTON

PHILADELPHIA 42, PA. OFFICES IN PRINCIPAL CITIES



This Lectromelt furnace with rapid top charging is saving man-hours for Dominion Foundries & Steel, Ltd., Hamilton, Ontario, Canada, for over 30 years producers of Dofasco Double Refined Steel Castings.

WHOOSH! AND YOU'VE STARTED TO MELT WITH YOUR TOP-CHARGING LECTROMELT* FURNACE

That top charging can save you an unbelievable number of man-hours. So many that one superintendent testifies, "I'd need labor at 40 cents an hour if we didn't have top charging on our furnace."

When you're about to invest in an electric furnace, make sure it has all these features:

Top-charging design to save man-hours, cut electrode consumption, save power, lengthen lining life.

Counterbalanced electrode arms.

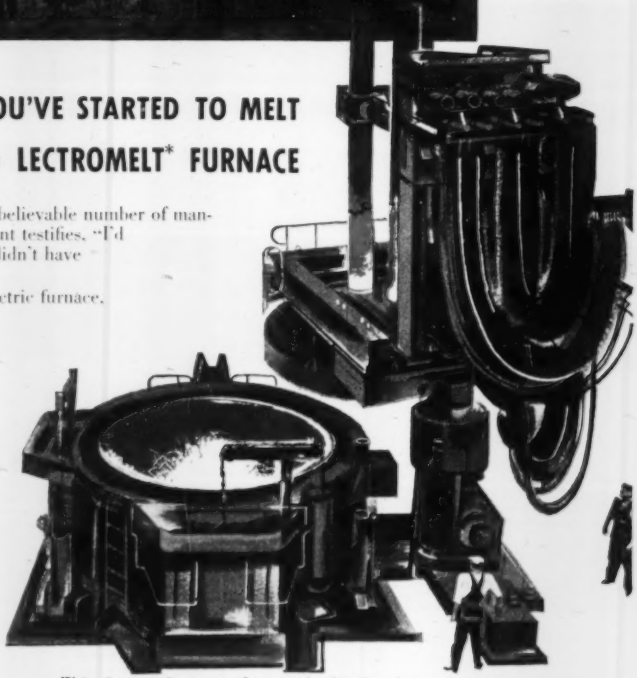
Engineered power supply and power supply regulation.

Independently mounted top, oil-bearing supported.

Side-mounted tilting mechanism.

Complete factory assembly and testing for mechanical operation.

You'll be paying for all these anyway. Get a Lectromelt—and be sure you get them!



Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . SWEDEN: Birlec, Elektkougnar A. B, Stockholm . . . AUSTRALIA: Birlec, Ltd., Sydney . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa.

Write for your free copy of our catalog No. 8—gives you the whole story on what Lectromelt can do for your production. Pittsburgh Lectromelt Furnace Corporation, 323 32nd Street, Pittsburgh 30, Pa.

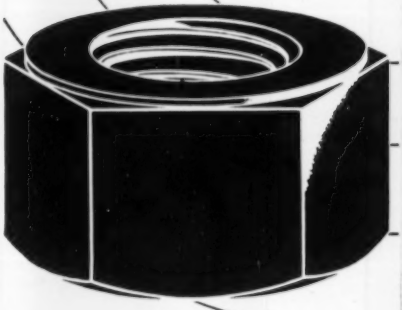
*REG. T. M. U. S. PAT. OFF.

WHEN YOU MELT... MOORE RAPID *Lectromelt*

NO STRIP! NO SLIP!

Republic
UPSON

HEX HEAD CAP SCREWS AND SEMI-FINISHED NUTS

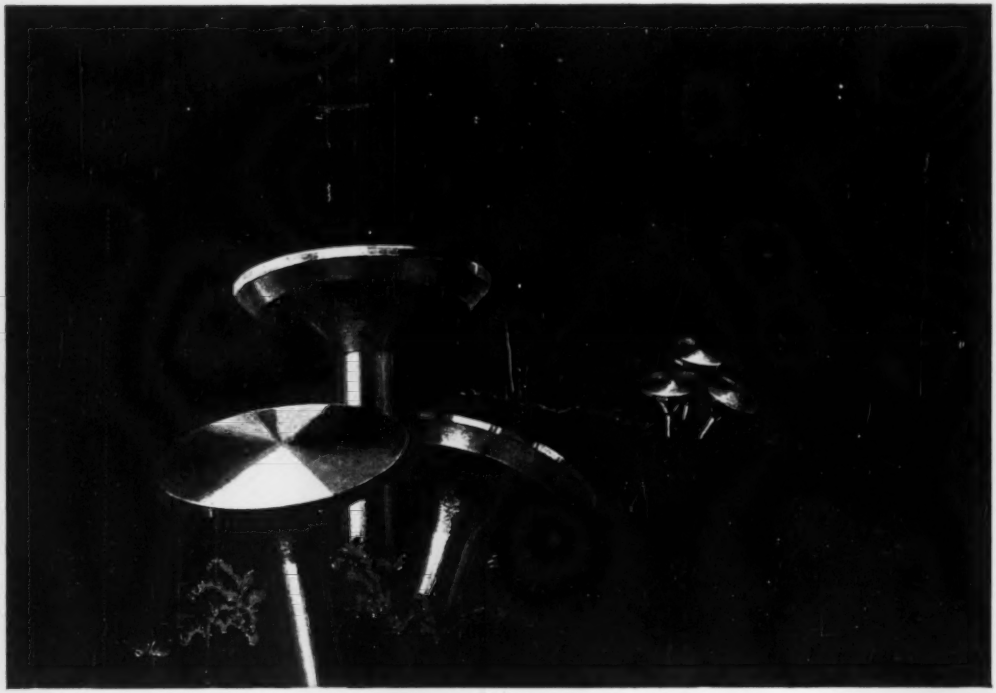


Strip and slip are strangers to Republic Upson Products. Why? Because threads are clean, accurate, tough—able to take heavy torque... because shanks are round, right-sized and rugged ...and because wrench-fit on nuts and bolt heads is snug and secure. You can count on Republic Upson for uniform high quality. Why not call on its 20,000 shapes and sizes for standard bolt and nut needs?

REPUBLIC STEEL CORPORATION
Bolt and Nut Division
CLEVELAND, OHIO · GADSDEN, ALABAMA
Export Department: Chrysler Building, New York 17, N. Y.

REPUBLIC STEEL

ARE YOU SLOWING STEEL PRODUCTION?
Idle scrap in your plant can hold back steel manufacture. Scrap old equipment now! Get scrap on its way today!



MAKE YOUR PRODUCTION MUSHROOM!

THIN-SHELL SAND MOLDS AND CORES GIVE YOU MORE, BETTER CASTINGS PER TON OF METAL POURED

Here are sound reasons why thin-shell sand molds and cores bonded with BAKELITE Phenolic Resins increase the yield of sound castings...

- Finer-grain sands provide well-nigh pattern smooth castings, minimizing finishing.
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- Tolerances of .002 to .005 inches per inch drastically cut finishing of castings.

Add to these advantages: Tamping and vibrating of sand no longer necessary, thereby extending life of patterns... ninety per cent less sand required . . . molds and cores are strong, moisture-resistant, stable, with long storage life... floor space, time and money are saved.

For complete information on BAKELITE Phenolic Resins for bonding thin-shell sand molds and cores, fill out and mail the attached coupon today.

Dept. CU-43, BAKELITE COMPANY,
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

Please mail my free copy of the Booklet K 10, "BAKELITE Phenolic Resins for Foundry Molds and Cores."

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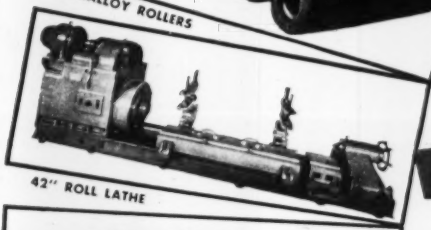
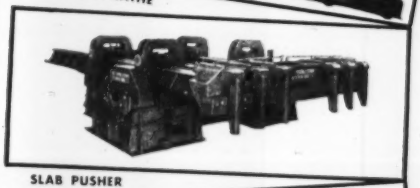
F&Y EQUIPS THE NATION'S STEEL MILLS *to Speed Production*

MACHINES, EQUIPMENT, ROLLS AND CASTINGS

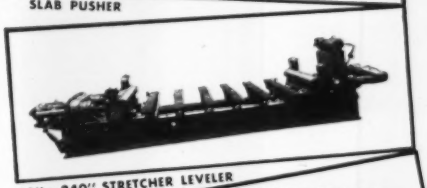
PARALLOY ROLLERS



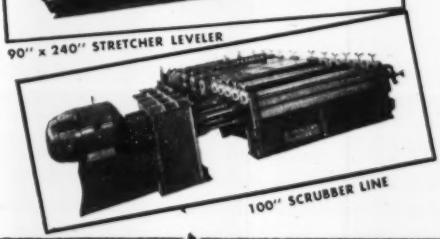
42" ROLL LATHE



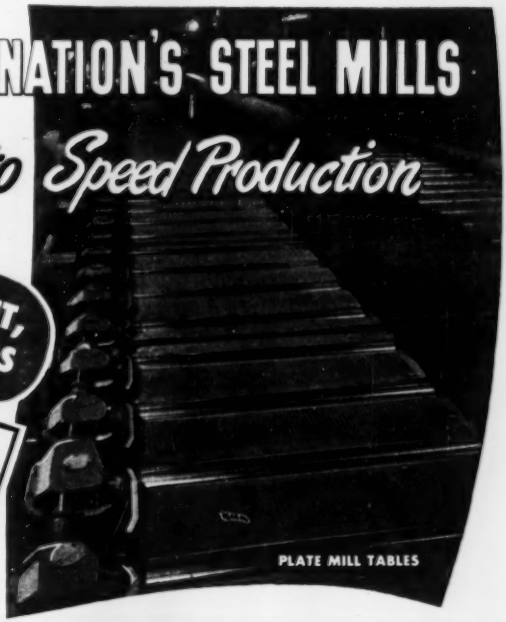
SLAB PUSHER



90" x 240" STRETCHER LEVELER



100" SCRUBBER LINE



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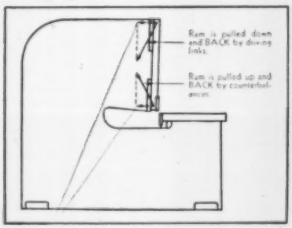
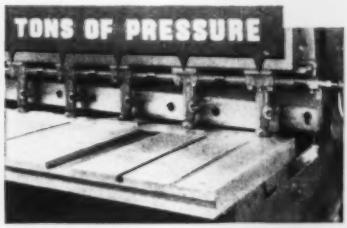
Keep up to date on Shearing!

Learn about... the exclusive features illustrated below—and many others.

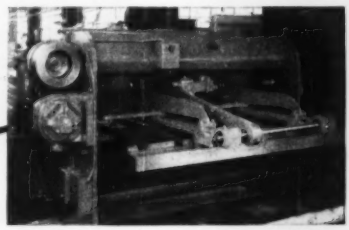


Cincinnati Non-Float Ram

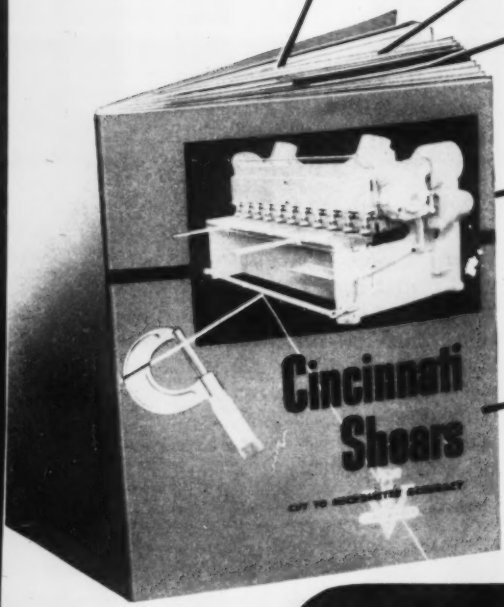
Cincinnati Sure-Set Knife Aligner



Cincinnati Hydraulic Holddowns



Cincinnati Magnetic Sheet Support



Just off the press This up-to-the-minute, illustrated catalog will give you a complete description of the speedy, accurate All-Steel Cincinnati Shears in capacities from 12 gauge to 1¼-inch steel plate, in 4-foot to 24-foot lengths. Also, many special features for particular needs are illustrated and described.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.

SHAPERS · SHEARS · BRAKES

CINCINNATI

November 26, 1951

The Pinch Hurts

A pinch in transportation is beginning to hurt. The pain is principally in the Midwest and applies to railroads and trucks. The shortage is caused by the virtual end of the Great Lakes shipping season and bad weather which slows the use of land transport. To relieve the situation, load and unload cars and trucks promptly, clean cars and trucks of all refuse and debris so that equipment will be available for immediate use, load cars and trucks as heavily as practical, use care in unloading equipment to prevent damage.

Gray Market: Still Minor

Sensational disclosures in Chicago before the Senate subcommittee chairmanned by Sen. Blair Moody (Dem., Mich.) about gray market steel operations would appear to mean that premium deals are flourishing. Yet the consensus among steel users is that a gray market exists, but that it's a minor factor and far less serious than the one operating in 1948 and earlier. Actually, the legitimate conversion market in steel, often a barometer indicating how well the gray market can do, is languishing today.

No Tin Can Scrap Drive—Yet

The scrap shortage is serious, but it will have to be desperate before the pots, pans and tin can drives of World War II days will be repeated. The pots and pans salvaging proved inefficient and our facilities to de-tin tin cans are limited. U.S. de-tinning capacity now is only 175,000 tons, and that's all being used on tin plate and tin cans supplied by government agencies and other groups who prepare them properly.

Pensions and the Stock Market

An almost embarrassing amount of cash is piling up from industrial pension funds. A lot of it is being invested in the stock market, a factor that's bolstering the New York lists. With that kind of money, investments have to be in the larger, blue-chip organizations. For that and other reasons, the big, established companies probably will continue to show well on the New York Stock Exchange.

Gaining: Titanium Output

Titanium Metals Corp. of America and Rem-Cru Titanium Inc. are turning out about three tons of titanium a day, expect to produce four tons a day by next Mar. 1 and about ten tons a day by next Sept. 1. Du Pont makes no metal but does turn out sponge and is being asked to boost output of that. A major use for titanium now is in jet engines.

FTC Girds Its Loins

Big business can expect another wave of investigations by the Federal Trade Commission, this time on the effects of mergers and consolida-

Production-Engineering News—p. 81 *The Market Outlook—p. 131*

tions on competition. The current annual merger rate is about 750, the highest on record. To be studied will be the impact mergers have on defense prime contracting. The Munitions Board figures show that 24.5 per cent of the total dollar value of prime defense contracts went to small business in fiscal 1950, 21 per cent in fiscal 1951 and about 16 per cent last July, the latest month for which figures are available. If subcontracts were figured in with the primes, the small business share would show larger.

Strike in Communications?

Watch for a possible strike in the communications industry. Two of three U.S. areas in which the Communists dominate virtually all organized labor—in copper mining and stevedoring—have already been plagued by dress rehearsal strikes. Communications labor is also Communist-controlled, and tell-tale restiveness is appearing from that direction. Now that a perspective is possible on last summer's copper strikes, the serious extent of the blow Reds dealt the defense program can be realized.

More Foreign Tools

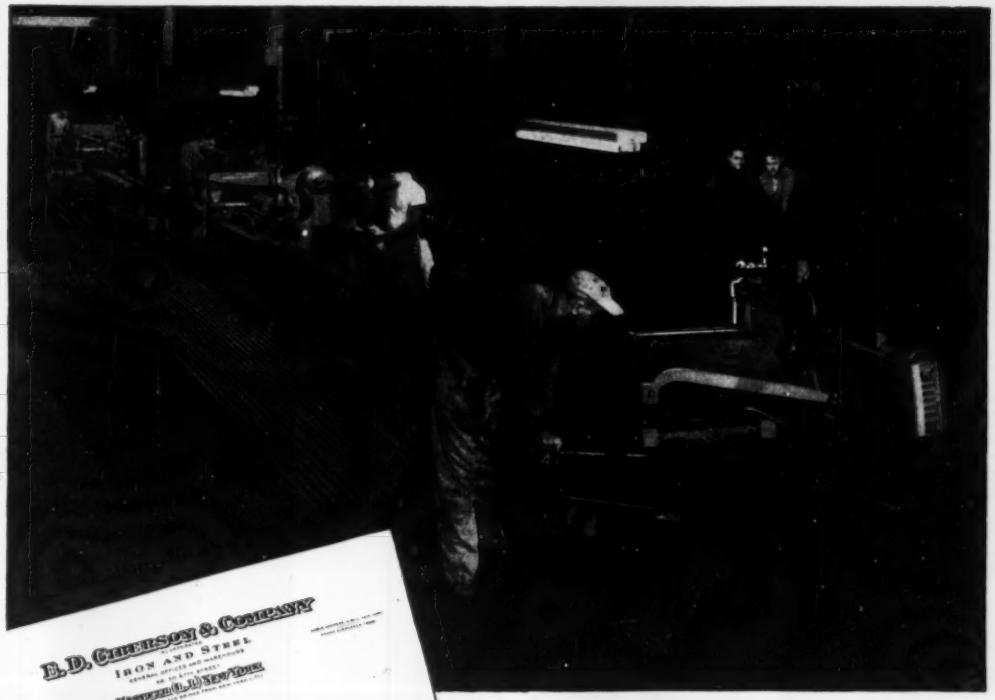
More foreign machine tools are coming into the U.S. Still a drop in the bucket compared with domestic production, foreign machine tool shipments are nevertheless gaining. First models of German machine tools will arrive for New England industries soon. Eight British tool builders are beginning delivery on equipment for the U.S. Equipment arriving includes radial drills, milling machines, lathes, hydraulic presses, shapers, automatic screw machines, broaching machines, tool grinders and automatic chucking machines.

Straws in the Wind

Prices have been boosted on GE home appliances and Chevrolet trucks . . . Studebaker expects to lay off South Bend, Ind., workers during the next quarter . . . The Hamilton, Ont., area may become the automotive center of Canada, now that Ford has built a new assembly plant in Oakville, near Hamilton . . . First 60-foot hull for the Grumman Albatross has been delivered by the Plymouth Division, Evansville, Ind., to Bethpage, L.I., N.Y., five months after the Chrysler unit began work on the assignment . . . Watch for a general overriding regulation designed to give small manufacturers the chance to use the Capehart Amendment formula in a simplified form.

What Industry Is Doing

Metalworking gets the call to supply more ammunition components (p. 53) . . . Steel wage hearings open tomorrow (p. 54) . . . Ford and Cleveland-Cliffs join forces to produce iron ore (p. 54) . . . A process that may ease headaches of producing titanium commercially has been developed (p. 54) . . . Here's how to organize a one-shot scrap campaign (pp. 56-57) . . . Management's responsibility analyzed (p. 59) . . . Spring makers are divided on question of where steel allotments should go (p. 59).



E. D. GIBERSON & COMPANY
IRON AND STEEL
New York

Armstrong-Blum Manufacturing Co.,
Chicago, Illinois

Gentlemen:

For almost half a century as direct distributors of Boiler Tubes, Condenser Tubes in seamless steel, electric welded steel and stainless steel, as well as seamless and welded Mechanical Steel Tubing, Seamless Steel Pipe, Stainless Steel Pipe and Tubing, we have our warehouse many million feet of Tubular Steel Products.

The nature of our business necessitates both speed and accuracy in multiple cutting to exact lengths required by customers. When we decided recently to install three more 9A MARVEL Heavy Duty Automatic Hack Saw Machines, it was with full knowledge of their efficiency.

We can assure you of our entire satisfaction with their operation and regard them as valuable additions to our equipment.

Yours very truly,
E. D. GIBERSON & COMPANY, INC.
E. D. Giberson
President

Another Tubing Warehouse

"Goes MARVEL"

Warehouses that are not equipped with proper sawing machines find that the cutting of steel tubing (especially the stainless types) is a difficult and costly job. But E. D. Giberson & Company, New York, have cut off millions of feet of all types and sizes of steel tubing to accurate lengths, economically and without difficulty, due to the fact that they have long been properly equipped with MARVEL SAWS. And because they have found MARVEL SAWS so trouble-free, so reliable, so economical to operate and so universally suited to all their cutting-off jobs, they have recently added this row of three new MARVEL No. 9A Automatic Hack Saws. With this additional equipment, they have expanded their facilities and can more promptly serve their fast-growing list of satisfied customers with steel tubing of all types and sizes, "cut to customer's specified lengths."

The local MARVEL Field Engineer will be glad to study your range of cutting-off work—whether it be in pipe, structural shapes, bars, or the toughest and largest alloy billets—and will then make recommendations on how you can improve your cutting-off operations to reduce costs and increase man-hour output.

Just write us on your letterhead: "Without cost or obligation on our part, send your local Field Engineer to look over our cutting-off operations."

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MARVEL SAWS
Better Machines—Better Blades

ARMSTRONG-BLUM MFG. COMPANY

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TURN IN ALL YOUR DORMANT SCRAP NOW...

Help keep up the nation's steelmaking rate this winter

Urge all your customers and suppliers, all your friends and business neighbors to turn in their scrap, too!

In cooperation with the Steel Industry Scrap Mobilization Committee

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RELIANCE *Job-Fitted* PRODUCTS

COLD ROLLED STRIP STEEL and FLAT WIRE

Coils . . . Cut Lengths . . . All Tempers

SHEETS

COLD ROLLED . . . HOT ROLLED . . . H. R. PICKLED . . . LONG TERNE . . . GALVANIZED

Standard and Production Sizes or Cut to Actual Working Dimensions

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Basic and Serious

Short-range goal of the present scrap drive is to make up a threatened deficit of more than 7 million tons of purchased ferrous scrap. Men who know the problem best say that the goal is attainable by hard work. They estimate that of the amount needed, about 2 million tons can be found in dormant scrap.

Dormant scrap consists largely of obsolete equipment, machinery, tools, dies, etc., much of which resides in manufacturing plants. Currently several thousand steel mill and steel warehouse salesmen are combing every industrial area, plant by plant, looking for this kind of scrap. To date, reports of the results of their efforts have been encouraging. They are doing a magnificent job and deserve much credit for it.

Unfortunately, even if they do better in the future than in the past, their best may not be enough. Our one-time smoothly operating scrap cycle has been badly distorted for more than a decade. A substantial percentage of our ferrous metal output has been going out of the country. Millions of tons went to out-of-the-way spots all over the globe where it is difficult if not impossible to recover it. Millions of tons lie at the bottom of the ocean. Other millions are in the hands of enemies who were once allies.

While we were suffering these losses in supply, our needs were mounting at an unprecedented rate. Our increase in steel ingot capacity from under 100 million tons in 1950 to about 118 million tons at the beginning of 1953 calls for a substantial increase in the supply of purchased scrap.

Really we face two threats—short pull and long pull. The short-term problem is aggravated by unseasonable weather. The early storms this year can easily cancel out much of the fine work of our scrap drive personnel. Looking toward the long pull, we've got to find ways to overcome the bad effects of more than a decade of distortion of our scrap cycle. We can't afford to trifle with our scrap challenge. It is basic and it is serious.

E. L. Shaner

EDITOR-IN-CHIEF

THOSE VITAL 7 POUNDS: Controls by government seem to be subject to an increasing volume of sincere criticism. A. B. Homer, president of Bethlehem Steel Co., told a group of naval architects and marine engineers that the trouble today "isn't a shortage of steel; it's bad distribution." He thinks that the government's action in suspending work on 14 ships in the Mariner program because of lack of steel is unnecessary.

"Tex" Colbert, Chrysler Corp. president, pictures government bureaucracy as the back-seat

driver who constantly dictates the path the car should take. A lot of the restrictions on motordom are likely to backfire.

National Production Authority has issued a comprehensive table of steel allocations for first quarter. How many expensive man hours do you think were spent in determining that Classification 36213A, Electric Razors, with a base credit of 21 pounds of aluminum, received no allotment in fourth quarter of 1951 and will be allotted 7 pounds during the first quarter of 1952? —pp. 64, 65, 67

* * *

MORE SUBCONTRACTING: Next year is almost certain to witness a substantial growth in opportunities for metalworking companies to engage in subcontracting in two important branches of defense work.

One of these is in the field of electronics. Almost $5 billion of the recent military appropriation of $59 billion is earmarked for electronic programs. Much of the work contemplated under these programs is of a character that can be distributed among numerous qualified subcontractors. One major prime contractor in this field says that "as an industry we're fundamentally assemblers and have always relied on a flow of parts from suppliers to keep our lines moving."

An upsurge in subcontracting in the manufacture of ammunition also is likely. Until now ammunition orders have been placed largely with a few prime contractors and government arsenals. Now the plan is to spread the work more widely through subcontracting, as was done extensively in World War II. —pp. 53, 82

* * *

USED MACHINES SCARCE: At a time when many metalworking plants are eager to buy more machine tools—new or second-hand—the supply of used and rebuilt equipment is becoming exceedingly restricted. Many used machinery dealers are hard hit by this situation and a few are going out of business. Rebuilders are somewhat better off, but most of the 940 major companies in the used and rebuilt machinery business think that sales in 1951 will fall below the $175 million mark recorded last year.

There are several reasons for the drought. One is that users of machine tools are reluctant to offer them to dealers, even if they have no immediate use for them. Models built since 1940 are virtually out of the market. Another factor is that some machines are offered at such high prices that they cannot be resold or rebuilt profitably under the industry's pricing regulation, CPR 80. —p. 55

* * *

THE PLOT IS ROUTINE: Detroit chapter of the Society of Automotive Engineers was treated to one of those rare debates on what we want and what we can provide. H. J. Cutler, Bethlehem Steel, did a good job of explaining how the steel industry has vastly improved its service to motordom by providing it with the products of the continuous mills. E. S. MacPherson, chief engineer of Ford Motor Co., somewhat in the advantage of the offensive, outlined a number of ways in which sheet steel producers could improve their product for automotive consumers.

The debate was inconclusive and academic, because under today's conditions, neither side can do much to change things. If we ever get back to a common sense basis of operation, the fur will fly. The always dissatisfied auto people will demand more and the always accommodating steel producers will provide more. This act has become routine. —p. 67

* * *

RECOVERS MANGANESE: In view of the fact so much of our manganese has been supplied from foreign ores, anything which contributes to the extraction of manganese from domestic sources is timely and important. Currently, marked attention is being paid to the Sylvester process for the recovery of manganese and iron from open-hearth slag and low grade ores.

The process consists of three steps. First, the slag is corrected to a molecular lime, accomplished by the addition of limestone or silica and firing until the oxides separate. Second, the oxide phase is separated from the silicate and phosphate phase. Third, the oxide phase is either reduced directly to spiegeleisen or, by a two-stage reduction, to iron and ferromanganese.

The process recovers in the concentrate from 75 to 85 per cent of the manganese and iron contained in the original slag. —p. 84

Tool Steel from Ryerson

Easier to Buy...Safer to Use

Steel procurement is trouble enough these days without adding unnecessary steps. That's one reason why more and more metal working shops are ordering tool steel from Ryerson, their regular warehouse steel source. This way, one call often does the work of two. One order, one invoice covers tool steel *and* other requirements.

You can safely buy this way because Ryerson tool steel stocks meet high standards of quality. Every bar is unmistakably identified by type with full length color marking. And with every shipment you get exact instructions on how to harden your Ryerson tool steel.

Hundreds of tons of tool steel are on hand at Ryerson plants, ready for quick shipment. Included are oil hardening steel, water hardening steel, flat ground stock—all the types described at the right. We suggest that you investigate the performance on these steels. For in addition to their high quality, Ryerson tool steels are economical in price. Call the Ryerson plant nearest you.

CHECK YOUR NEEDS AGAINST THESE STEELS

✓ **RY-ALLOY**—A special analysis, *oil hardening* tool steel. Ry-Alloy machines better than most steels of its type; attains high hardness and deep penetration after treatment. Order it in rounds, squares and flats from a wide size range, all spheroidized annealed.

✓ **VD TOOL STEEL**—A *water hardening* carbon-vanadium steel available in rounds, flats and squares of many sizes. Retains its fine grain even when overheated. Spheroidized annealed.

✓ **VD CHISEL STEEL**—A *water hardening* carbon-molybdenum steel made especially for hand and pneumatic chisels. Hex's and octagons only.

✓ **RY-ALLOY GROUND FLAT STOCK**—Accurately ground on all four sides to plus or minus .001". Annealed for easy machining, it may be oil quenched to Rockwell C-61 or higher. 156 sizes.

✓ **RYERSON DRILL ROD**—A high grade carbon drill rod made of good quality tool steel, finished with extreme accuracy, and free from decarburization.

WRITE for TOOL STEEL DATA

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. STEEL SERVICE PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

"Let's try it without the stretcher levelling," said Art

For some time, an Inland Customer, who makes farm implements, had been buying 62½" x 128" sixteen gage cold rolled sheets for a certain part and had always specified that they be stretcher levelled and resquared to insure extra flatness.

The process of stretcher levelling and resquaring at the mill added substantially to the cost of the cold rolled sheets. Art Brackett*, the Inland sales representative on this account, questioned the need for this costly operation.

One day, on a visit to the customer's plant, he asked to take a look at the part being fabricated from this large sheet. He found that the stretcher levelled and resquared sheets were shipped from Inland to an independent fabricator for blanking. They were then shipped to Art's customer who further fabricated them and welded on bracing and framing sections before assembling them on his implements.

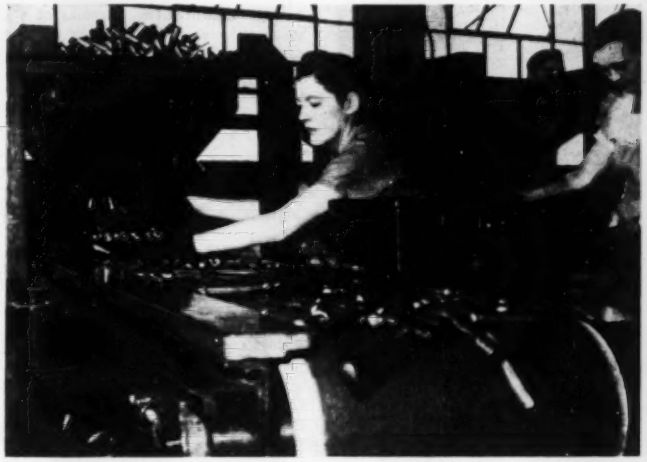
In talking to his customer's purchasing agent and production manager, Art suggested that the extra flatness achieved by stretcher levelling was lost by the time the sheet was assembled on the finished product and was, therefore, unnecessary. The customer changed his steel specification for this part, eliminating stretcher levelling and resquaring.

Making Steel Do Your Job Well Is Inland's Job.

Result: A saving for Inland's customer of over $4.00 per implement—a saving that has already run into thousands of dollars! INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago 3, Illinois.

*Names used are fictitious

Your Scrap is Needed by the Steel Industry for National Defense



WORLD WAR II AMMUNITION-MAKING SCENES MAY BE REPEATED
. . . as prolonged Korean fighting eats up supplies

Ammunition: More Subcontracts

Almost any kind of metalworking equipment can be used for some phase of ammunition subcontracting, so good opportunities exist for small and medium companies

"PRAISE the Lord and Pass the Ammunition."

That World War II refrain may soon be heading for a revival and acquiring a slightly different meaning, especially with metalworking companies looking for more defense subcontracts. The chances are that United Nations forces will be needing more ammunition, and the certainties are that the American ammunition industry will have to subcontract more to be able to meet demands.

Not Yet—Subcontracting opportunities for ammunition parts have thus far not been spectacular. That's because stocks at the start of the Korean War were substantial and because ammunition consumption until recently was heavy but nothing like World War II proportions. But the use today in Korea is increasing, partly because of the new staccato pace of the air war, and the stocks have been depleted. As Brig. Gen. Merle H. Davis, an Army Ordnance officer, puts it, "the time has come for the ammunition industry to really start producing."

The established ammunition industry consists of just five makers of small arms ammunition, a handful of specialty producers and the government ordnance plants. That setup comprised the nucleus for vast ammunition output in World War II. High production was made possible by an army of components subcontractors. Not many stand-by plants were kept after World War II because they weren't needed. Most ammunition work is in the classic mass-production tradition and readily adaptable to many metalworking plants with a minimum of equipment changes.

Hand in Glove—Many automotive parts producers are today in good shape to take ammunition subcontracts, both because they are equipped for the high-quality, repetitive operations needed and because sliding auto output leaves them with open capacity. Normally no companies in Michigan make ammunition, but last year the dollar volume of ammunition production in the Detroit Ordnance District was about $1 million. At the peak of World War II, an estimated 3000 to 4000 ammunition subcontractors operated in the state, an average of five subs per one prime contractor in the region. Presently there are about 400 ammunition subcontractors in the area.

The Detroit Ordnance District stresses that virtually any kind of metalworking equipment can be used for some phase of ammunition subcontracting. That means that small, medium or large presses can be employed, screw machines, etc. To get ammunition subcontracts, the Detroit Ordnance District recommends contacting prime contractors. But it suggests that first, if practical, you take a look at the parts on display at its small business section. Some of the other government ordnance facilities have similar exhibits.

Get Set—Ammunition subcontracting is no bed of roses. Competition is fierce because automotive and other kinds of companies can participate. Also, it's a more exacting job now than during World II because requirements today are more complicated. But more ammunition subcontracts will be passed out. Can you qualify to get one?

Mullins Expands for Shells

Mullins Mfg. Corp., Salem, O., is spending more than $1 million on expanding and equipping its Liberty plant at Warren, O., to handle military shell contracts.

Mullins has a certificate of necessity for five-year amortization of much of the cost of a plant addition. The company developed a cold steel extrusion process and reportedly holds $20 million worth of shell orders which will be filled at the Warren facility by that process. The Liberty plant once was the property of Liberty Steel Co., a producer of tin plate. When Mullins acquired it, the facility was used as a warehouse.

Rheem: Cartridge Case Maker

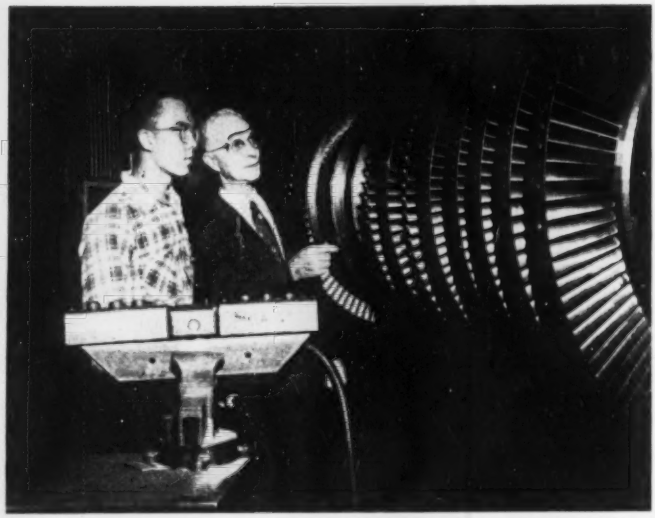
Rheem Mfg. Co. will operate a new artillery ammunition plant at Burlington, N. J., for Army Ordnance.

Rehabilitation of the plant will begin immediately, after which it will be tooled for production of steel—not brass—cartridge cases. Operations may begin next July, and the employment peak will be about 1000. Improvements in drawing and machining techniques make possible the use of steel instead of brass for cartridge cases (STEEL, July 9, p. 72).

Aerial Bomb Contract Signed

Universal Match Co., St. Louis, signed a $5 million contract with Army Ordnance to operate the Longhorn Ordnance Works at Marshall, Tex. The plant will produce aerial bombs.

Limited production will start by



FROM EIGHTEEN TO SIXTY-EIGHT: The most important single source of skilled craftsmen and manufacturing supervisors is the way General Electric Co. describes the alumni of its apprentice worker program. On hand when GE recently marked the 50th anniversary of the program were 68-year-old Frank Lange, sole member of the first graducting class of 1903, and Paul Bonneau, cn 18-year-old apprentice

next February or March. Greater output is scheduled by midsummer.

Wage Talks Start

The steelworkers and much of the industry begin negotiations that will govern price trend

NEGOTIATIONS between Big Steel and the CIO-United Steelworkers start tomorrow, Nov. 27, in the William Penn Hotel, Pittsburgh.

Reports have it that some Washington stabilizers already have their pencils sharpened to figure how the steelworkers can get a good-sized hike without making the wage control system a laughing stock.

Logic? — They may figure that "productivity" boosts of about 15 cents an hour don't count as actual pay raises. The union doesn't have paid holidays. That would add about 4 cents an hour and could be wrestled around to mean a non-inflationary hike. That, plus the 4 cents an hour that the union legitimately has coming, would bring a wage boost of 23 cents an hour that conceivably might be won.

U. S. Steel Corp. President Ben Fairless points out: An increase of 1 cent in the basic wage of our employees would mean an increase of more than $10 million dollars a year in the total employment costs of U. S. Steel alone. Beyond that, our experience has taught us that for every additional dollar we pay for labor, we will be compelled to pay another extra dollar for goods and services as the spiral reaches our suppliers. So for every cent that the basic wage of our workers is now boosted, we must add $20 million to the price of the products we sell."

Higher, Anyhow — Payments to wage earners in the iron and steel industry set a record at an average of $1.974 an hour in September, 4 cents higher than the eight-month average, American Iron & Steel Institute reports. The payroll of the industry in nine months was more than $2.1 billion, exceeding the annual payrolls for any full year except 1950 and 1948.

Wage earners worked an average of 39.1 hours a week in September, compared with 40.4 in August. Employment in the industry in September was an estimated 676,700, off 2400 from August after a steady climb to record levels from about 600,000 two years ago.

Titanium Process Unveiled

A process that may prove successful in extracting defense-vital titanium economically in large quantities has been developed by a Columbia University graduate student.

An electrolytic method is used to reduce the chloride, which is prepared from titanium oxide commonly found in nature. Arthur J. Kerbecek Jr., who developed the process, says it can also be used for reduction of zirconium, sought after by the Atomic Energy Commission. Results of the research may be tested in a pilot plant operation to determine if titanium produced is acceptable for industrial use and if it will be economical to use the process commercially.

Ore Concentrator for Michigan

A facility capable of annual production of 400,000 tons of iron ore concentrate will be built by Ford Motor Co. and Cleveland-Cliffs Iron Co. at Humboldt, Mich., on the Marquette range. It will bring back to life an open pit operation that has been dormant since 1920.

Using the nonmagnetic oil flotation process usually associated with copper mining, the concentrating plant is expected to produce a material of higher iron content—65 to 69 per cent—than is now available from the Lake Superior region.

Construction of the first concentrating plant with annual capacity of 200,000 tons will begin immediately; operation is planned for late 1953. A duplicate plant is scheduled for completion in 1955. Plans call for construction at a later date of an agglomerating facility. Initially the concentrate will be shipped to Ford's new Rouge sintering plant where it will be converted into enriched sinter.

Atomic Furnace Developed

Use of atomic power in industry came closer than ever with announcement of a new nonmilitary, low-cost "atomic furnace" developed by scientists of North American Aviation Inc., Inglewood, Calif.

Designed by the plane-builders' atomic energy research department, Downey, Calif., the machine is a low-power "reactor" which releases its energy slowly over a period of many years. Power output is 160 kilowatts eight hours a day, five days a week for ten years on a single charge of uranium. The machine is designated a research tool at present but according to Dr. Chauncey Starr, director of North American's atomic energy research activities, the machine can be used for experimental work in atomic energy research and by industry.

The machine was designed as a low-cost source of atomic power capable of being built in quantities within 18 months from North American blueprints. North American scientists estimate the machine can be built for $1 million.

Drought in Used Machinery

Equipment users are hanging on to their old units, so fewer and fewer used machines can be offered for resale to more and more potential customers

THE USED and rebuilt machinery market is tightening up.

The reason: Less and less of that type of equipment is being offered for sale to the dealers or rebuilders who have more and more potential customers. Some that is offered carries such a high price tag that it can't be resold or rebuilt profitably under CPR 80, the industry's pricing regulation.

Hard Hit—Many used machinery dealers are hard hit by the situation and several are going out of the business. In better shape are rebuilders, most of whom are operating at capacity on regular work, government-owned tools and on contract jobs for machinery users who want their equipment rebuilt. As a result of the drought, few of the 940 major companies in the used and rebuilt machinery industry believe that 1951 sales will reach the $175 million volume achieved in 1950. The rebuilding volume will hold, but the strict resale end of the business is falling sharply.

"Late" machinery models—those built since 1940—are virtually out of the used and rebuilt market, except for government tools. Because of difficulties in getting new equipment, owners tend to hang on to their old machines even if they have no immediate use for them. Contract arrangements are also more common. Although rebuilders like that kind of work where they can refurbish a customer's machine on a cost-plus basis, the practice takes that many more machines from the used market. One reason for the scarcity of used machine tools is the tool builder's practice of reciprocity. When they dispose of one of their production tools, they turn it back to the original builder. Because tool builders are an important group of tool users, that practice is costing the market a good many units.

Contributory—Still another factor contributing to the used machinery drought is the practice of a few dealers of tearing down the machinery to sell the parts. That's done to beat the price freeze on the complete machine. Some dealers are unhappy with CPR 80, have asked OPS for changes, notably in percentage tables used to set resale prices.

A rebuilder such as Botwinik Bros., Worcester, Mass., has a tremendous backlog of orders to rebuild tools owned by the Air Force. The opinion among many rebuilders is that the Air Force was the most far-sighted among the services in that it kept many of its World War II tools and now has a good supply to lend or rent to its subcontractors. The stop-and-go government business is sometimes so high for a few rebuilders that they have no capacity left for regular commercial work.

In Greatest Demand—The types of used machinery in greatest demand are those which can be used in the jet program—knee-type millers, turret lathes, radial drills, vertical turrets, large surface grinders and boring mills. Gear cutting machinery is not ardently sought after.

Galbreath Machinery Co., Pittsburgh, is one of the few firms contacted by STEEL in the industry that believes the drought in used machinery will ease in the immediate future. Most think that prospective users of their products will have to wait nearly as long as for new equipment.

Used Tool Plant Planned

An $800,000 plant to be tooled for the rebuilding of machine tools is going up in San Jose, Calif., to be owned by Moore Industrial Co. Charles E. Moore, head of Industrial Assets Co. and owner of the Moore firm, said approximately 500 workers will staff the plant when it is in full production by mid-1952. General manager will be Charles A. Lockwood, vice admiral, USN, (ret.).

NEMA Elects Lincoln

Elected president of National Electrical Manufacturers Association at the association's 25th annual meeting in Atlantic City, N. J., was J. F. Lincoln, Lincoln Electric Co., Cleveland.

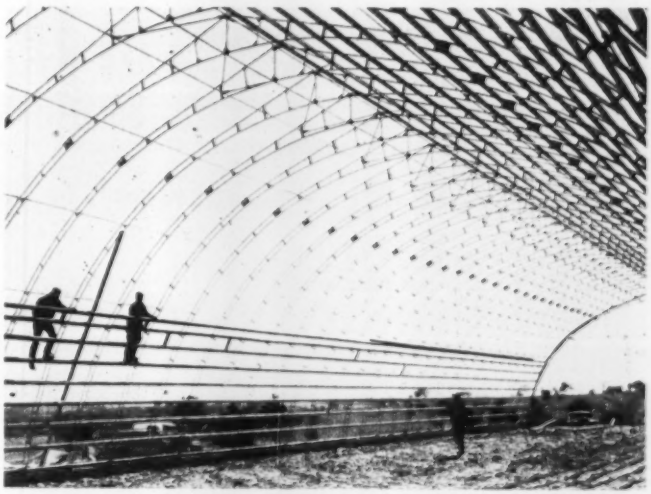
Five vice presidents were named: Arthur A. Berard, Ward Leonard Electric Co., Mt. Vernon, N. Y.; J. W. Corey, Reliance Electric & Engineering Co., Cleveland; J. H. Jewell, Westinghouse Electric Corp., Pittsburgh; Alan F. Sheldon, Kennecott Wire & Cable Co., Phillipsdale, R. I.; and Hoyt Post Steele, Benjamin Electric Mfg. Co., Des Plaines, Ill.

L. G. Hall, Stackpole Carbon Co., St. Marys, Pa., was chosen treasurer.

LP-Gas: More and On Time

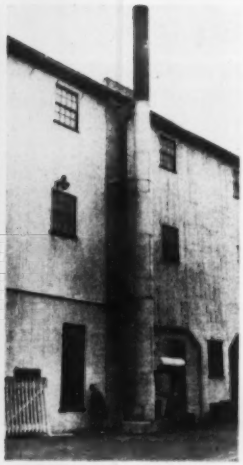
Chances are good that LP-Gas (liquid petroleum gas) users will be able to get enough gas this winter and get it when they want it.

The National Petroleum Council reports that availability of LP-Gas will be at a rate of 9,056,816 barrels per month beginning with January, 1952. That's 15.7 per cent more than the monthly rate in January, 1951 of 7,825,953.

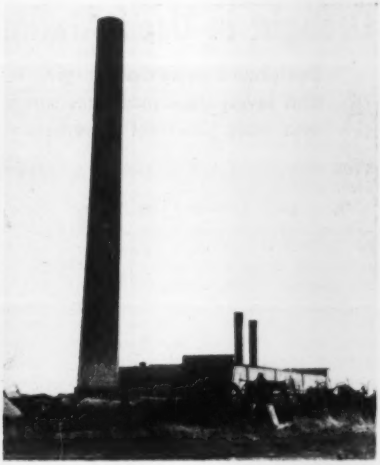


IN THE SUNFLOWER STATE: The semi-circular ribs of this building quickly identify it as a quonset-type structure. The workers are not caught in the maze of the frame; they're completing the building which will be a warehouse for an appliance firm in a new industrial area outside of Topeka, Kans.

SALESMEN WERE RECRUITED
. . . they asked for an on-the-spot survey



J. I. CASE CO. SMOKESTACK
. . . it was to come down, too



21 TUMBLING BARRELS
. . . forgotten for two years

Scrap . . . A Drive Unique in the U.S. Nets 2150 Tons

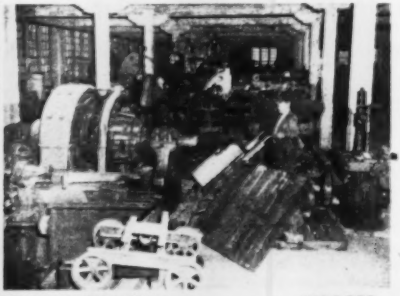
ABOUT 2150 tons or 54 carloads of dormant iron and steel scrap was located for immediate shipment to consuming mills and foundries in a unique one-day drive in Racine, Wis., on Nov. 15.

The drive was conducted by the Racine County Dormant Scrap Mobilization Committee, one of 2000 industry groups formed across the nation to function during the present scrap emergency. The concerted effort points the course for action by other committees to unearth the vital material.

Ramifications — The experiment may provide at least a partial solution to the problem of finding dormant scrap. The Racine tonnage is not immense, but neither is the area. The city has a population of about 75,000. Located in the county are slightly more than 100 plants employing 25 or more workers. The one-day affair publicized the shortage and will provide the impetus for more self-generation of the material from now on.

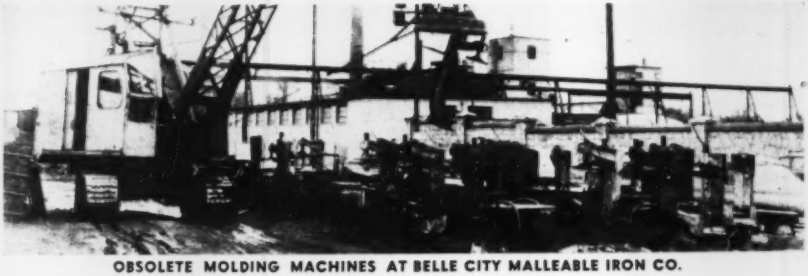
Every month U. S. steel mills and foundries must buy about 3 million tons of scrap, aside from the "home" material they themselves generate in their own manufacturing operations.

OLD TRACTOR WHEELS
. . . hundreds of these were uncovered in one of the several "hauls" made at J. I. Case Co.

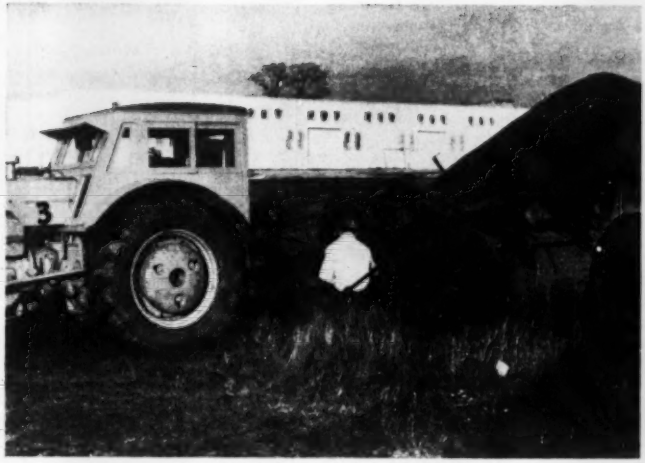


OLD MACHINERY . . . INDOORS

. . . AND OUTDOORS



OBSOLETE MOLDING MACHINES AT BELLE CITY MALLEABLE IRON CO.



TUMBLING BARRELS BEING READIED
. . . 60 tons of scrap from one company

DISTRIBUTION POINT: SILVER STEEL CO. YARD
. . . 30 tons from Belle City

of the Dormant Material in One Day at . . . *Racine*

Purchased scrap may be production scrap or dormant scrap. Production scrap is the left-overs from the process of manufacturing. The cycle for the return of production scrap works fairly smoothly, so the greatest efforts will be placed, as they were in Racine, on discovering dormant scrap. An estimated 2 million tons of dormant material (obsolete machinery, old tools etc.) can be realized in industry; about 2 million tons can be found in auto graveyards; 1.5 million tons can be freed by defense and other government installations; 1 million tons can be returned from battlefields; 1 million tons can be collected from farms; and 500,000 tons may result from shipbreaking.

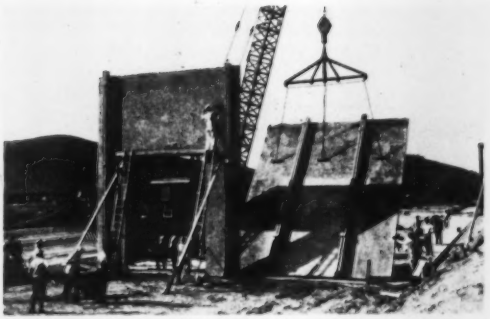
The Mechanics—The Racine effort was worked this way: 25 salesmen were recruited from steel producers and warehouses under auspices of the Steel Industry Scrap Mobilization Committee and American Steel Warehouse Association. They visited each plant, asked officials to make an on-the-spot survey of his facilities; give an estimate of the probable tonnage of scrap; and appoint a top executive with authority to make decisions as the plant scrap chairman.

The advance publicity for the drive

UNLOADING A HAUL

Looking over a graphic presentation of what was done in Racine: John Egan of Hamilton Beach Co., C. W. Jones of John Pritzlaff Hardware Co. (he netted 560 tons) and Drive Chairman A. O. Wolfe of Hamilton Beach. Biggest pledge of the drive was a 450-ton traveling bridge

PUSH FOR DEFENSE: Construction of the new Ford Motor Co. tank plant in Livonia, Mich., goes forward as a crane sets concrete wall sections in place. Separate crews poured and dried reinforced concrete slabs for walls while footings and steel framework were being erected. Engineers estimate a 75 per cent saving in construction time compared with using 12-inch brick walls



TOWARD GUIDED MISSILES: First prefabricated walls go into place on a warehouse at Navy-Convair Guided Missile plant in Pomona, Calif. Expected to be in operation about mid-1952, the plant will be operated by Consolidated Vultee Guided Missile Div. of Convair for the Navy Bureau of Ordnance. Four other major structures will make up the facility, first of its kind in the United States

saved the salesmen's time, for they weren't kept waiting in lobbies or didn't have to explain what they were after. In most cases the salesman toured the premises, gave advice on what could be scrapped. At Belle City Malleable Iron Co., a salesman won pledges for about 30 tons, including a dozen old molding machines, several hundred steel flasks, a few charging buckets and 6 to 8 tons of old straightening dies. R. J. Anderson, works manager, is heading up the company's scrapping program.

Scrap Mine—About 60 tons of dormant scrap was uncovered at the Tractor Works of J. I. Case Co. That included 21 worn-out tumbling barrels (see the photo) which had been forgotten in a field for two years. In one call, a salesman heard about some material at a stone quarry that had not been scheduled for investigation. He found and had committed some old quarrying equipment. Biggest pledge of the drive was a 450-ton traveling bridge used by Wisconsin Natural Gas Co. to unload coal from lake boats.

Arnold O. Wolf, assistant general manager, Hamilton Beach Co., was chairman of the Racine Committee, and George Harper, Burlington Brass Works, was co-chairman. Serving with them were William D. Stansil, executive secretary, Manufacturers' Association of Racine; Einar A. Jacobsen, Jacobsen Mfg. Co.; Harry A. Thorson, assistant treasurer, Belle City Malleable Iron Co.; Robert M. Wadewitz, vice president, Western Printing & Lithographing Co.; and Melvin G. Ward, vice president and plant manager, Walker Mfg. Co. Salesman who turned up most scrap in the drive was C. W. Jones, John Pritzlaff Hardware Co., Milwaukee. His tabulation showed 560 tons.

Scrap Piles Higher, Says NPA

Progress of scrap collection drives is already showing up in heavy steel scrap inventories of steel mills, says National Production Authority. A sampling of mills showed inventories of purchased steel scrap were up to almost a 45-day supply (compared with a low of 36 days in April). Collections normally drop off nearly one-third during severe weather and NPA says that slump must be averted this winter.

Possibilities for Subcontracts: Small Ships

CONSIDERED the possibilities of subcontracting for ships? Not the super-duper size, but the utility ship, the minesweeper and the docking ship.

Awards for construction of thirty 165-foot minesweepers to seven private shipyards have been announced by the Navy. Names of the yards are listed below. Many of the parts, supplies and assemblies which will go into those thirty ships offer some good subcontract possibilities. Approximately $49 million will be spent to build the sweepers, excluding centrally procured material which will add about another $9.9 million to the total bill of the minesweeper program.

Also listed are four firms which will build thirty-five 115-foot landing ships utility. The contracts totaled $9,114,000, including an estimated $120,000 per vessel for centrally procured items.

Moore Drydock Co., San Francisco, will be "lead yard" in a four-ship program for landing ships dock (LSDs). The company has a contract to build one of the 510-foot ships. No information is yet available on the cost of the program.

Other contracts awarded by the government, in excess of $250,000, follow:

Product	Contractor
Turret Lathes	Gisholt Machine Co., Madison, Wis.
Engine Lathes	R. K. LeBlond Machine Tool Co., Cincinnati
Press Brakes	Dreis & Krump Mfg. Co., Chicago
Milling Machines	Kearney & Trecker Corp., Milwaukee
Horizontal Extrusion Presses	Loewy Construction Co., New York
Ammunition Components	Weatherhead Co., Cleveland
Shells	Fasco Industries Inc., Rochester, N. Y.
Fuzes	Precision Castings Co., Fayetteville, N. Y.
Machinery & Equipment	Houde Engineering Div., Houdaille-Hershey Corp., Buffalo
	Thompson Products Inc., Cleveland
	Ford Motor Co., Dearborn, Mich.
	Kaiser Mfg. Co., Detroit
	Jack & Heintz Precision Industries Inc., Cleveland
	New Hampshire Ball Bearings Inc., Peterborough, N. H.
Minesweepers	Astoria Marine Construction Co., Astoria, Oreg.
	Luders Marine Construction Co., Stamford, Conn.
	Burger Boat Co., Manitowoc, Wis.
	Bellingham Shipyards, Bellingham, Wash.
	Higgins Inc., New Orleans
	Peterson Builders Inc., Sturgeon Bay, Wis.
	Wilmington Boat Works Inc., Wilmington, Calif.
Landing Ships Utility	Port Houston Iron Works, Houston
	Reynolds Ship Repair Inc., Buffalo
	Marietta Mfg. Co., Point Pleasant, W. Va.
	Inland Dock Inc., Kingston, N. Y.
Oxygen Generator Sets	Air Products Inc., Allentown, Pa.
Tractors	R. G. LeTourneau Inc., Peoria, Ill.
Ceilometers	General Electric Co., Syracuse, N. Y.
Accelerometers, Aircraft	Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.
Vaneaxial Fans	Jay Mfg. Co., Pittsburgh
Radar Sets	General Electric Co., Syracuse, N. Y.

Whither Management?

Management's responsibility gets attention at National Metal Trades Association's Convention

"WE ARE now witnessing the transformation of the United States from a federal republic to a welfare state on the road to totalitarianism," said Louis Ruthenburg, chairman of the board, Servel Inc., in an address before the National Metal Trades Association, in Chicago.

"The two forces (which threaten us) are diversion of income through taxation and short-sighted practices of monopolistic labor unions," he said. It is management's responcibility to take an aggressive part in the return to a free incentive economy, he concluded.

Mr. Ruthenburg was speaking before the 52nd annual convention of the NMTA, an association fostering equitable conditions in the shops of members for protection of both employer and employee. Activities of the group include assistance to its membership in areas of factory management, labor relations, wage and salary administration, incentives, supervisory and vocational training, personnel practices, employee communications.

"It is an interesting fact," Mr. Ruthenburg observed, "that, although Stone Age cultures have perpetuated themselves since time immemorial, more complex cultures invariably have developed the forces of their own destruction. It is an interesting question whether the United States can be the first surplus-producing culture to perpetuate itself."

The association's annual Industrial Relations Achievement Award was presented to Hugh L. Bills, Acme Steel Co., Chicago.

Charles S. Craigmile, president, Belden Mfg. Co., was elected president of NMTA for 1952. E. S. Day, Collyer Insulated Wire Co., was elected as first vice president, and N. L. Rowe, Ideal Roller & Mfg. Co., as second vice president and treasurer.

Spring Makers Divided

Wire spring manufacturers are divided on whether future allotments of steel should be made directly to them or to spring-consumer industries, the bedding and the upholstered furniture makers.

Originally, under CMP the spring consumer got the allotment to be passed on to his supplier. Currently, the spring makers are getting the allotments.

The spring manufacturers who prefer an "A" classification (allotments for steel going to spring consumers to be turned over to their suppliers) say that this system would protect them against charges of favoritism toward certain customers. Also, should the two major segments of spring users be classified with different degrees of "essentiality," the operation would run smoother for the consumer with an allotment in hand to search out a spring maker than vice versa.

Spring makers who favor a "B" classification (allotments for steel going to spring makers) say that this channels steel in a pattern which is normal to the industry. They point out that the small spring consumers would be unable to determine their steel requirements accurately.

In the event of material shortage, this group adds, it would be far better for the NPA to deal with 50 manufacturers than three or four thousand consumers. This advantage would outweigh the added burden on the spring manufacturer to make quota decisions for their customers.

The wire spring manufacturers say inadequate allotments and not shortages of material are forcing them to draw on inventories. Of the 79,000 tons of high carbon wire being produced each month, only 30,000 tons is going to the wire rope industry and 49,000 tons is available to meet the requirements of the wire spring makers and a few other users.

Enameling Process Developed

Ferro Corp. and Republic Steel Corp., both of Cleveland, have jointly developed a new process for finishing kitchen ranges, refrigerators and other porcelain enameled products.

The new process permits the application of a single coat of titania-opacified enamel directly to enameling iron and many cold-rolled steels, eliminating the ground coat and/or necessity for using premium steels.

While it may be some time before the new process can be successfully adapted to all the various finishing requirements, Ferro President C. D. Clawson predicts its wide use in the next few years with substantial costs savings. He also predicts that the new process will greatly broaden the use of porcelain enamels.

The new process involves the usual steps of cleaning and rinsing the steel, but a special pickling process which produces a sharper etch than the conventional sulphuric acid pickle is used. That process gives a rough surface to the metal. Instead of pickling, the surface may be sand blasted. The nickel deposition process is brought about by chemical reduction so no iron goes into solution. That gives the steel a more continuous nickel coating and prevents rust, a problem in the conventional process. Normal porcelain enameling techniques are used in applying the enamel to the steel. The one-coat finish is only half as thick as ordinary coatings.

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listed each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

COPPER—Direction 1 to NPA Order M-16 permits brass and bronze foundries, wire mills and brass mills to obtain supplies of copper raw materials in advance of receipt of monthly NPA allocations. The direction allows persons with authority to purchase copper raw materials (refined copper, copper scrap and copper-base alloy ingot) to place advance orders for and accept delivery on the first of each month of up to 50 per cent of the quantity of similar materials they were authorized to use during the preceding month. This direction, issued Nov. 19, 1951, is designed to overcome the delay some users experienced in receiving NPA authorization to purchase materials.

EXPORTS — Amendment of Nov. 19, 1951, of NPA Order M-79 removes five items from coverage of the order, which provides priority assistance in procurement of certain maintenance, repair and operating supplies for export. Eliminated are replacement parts for machine tools, parts and accessories for motor vehicles, specialized industrial gloves and leather industrial belting and abrasives. The amendment also limits coverage of laboratory supplies, instruments and equipment to items of a unit value of not more than $750.

SELF-CERTIFICATION—NPA Order M-89, issued and made effective Nov. 19, 1951, permits retailers who customarily sell insulated copper wire, nails and other steel, copper and aluminum controlled materials to the general public to self-certify authorized controlled materials orders to obtain limited quantities of such materials. Previously, CMP regulations did not permit retailers generally to replace the controlled materials they sold. Retail inventories, therefore, were diminishing.

COLOR TELEVISION — NPA Order M-90, effective Nov. 20, 1951, prohibits manufacture of color television sets for general sale. However, manufacture of color television for experimental, defense, industrial and certain hospital and educational uses is permitted.

Price Regulation

ANTIMONY—Ceiling Price Regulation 96, effective Nov. 21, 1951, sets dollars-and-cents ceiling prices on antimony metal, antimony oxide and sodium antimonate.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

Open door policy will rule SDPA, small business' hope for a greater share in mobilization. The agency is empowered to book contracts but hasn't yet been given money for the job

CREATING an adequate staff is first item on the agenda of Telford Taylor's new government agency, the Small Defense Plants Administration.

First appointment was one that will make for smooth relations with Congress. Mr. Taylor picked as his deputy administrator John Horn, who was administrative assistant to Sen. John S. Sparkman, chairman of the Senate Small Business Committee. Says Senator Sparkman: "A fine appointment."

Open Door—SDPA already is attracting small business visitors from all over the United States. Welcoming them, Mr. Taylor emphasizes that "the latch-string is out" and that all possible assistance will be rendered to small business.

As of this time, three types of assistance can be had in deserving circumstances. SDPA makes loan recommendations to Reconstruction Finance Corp., recommends materials allotments by National Production Authority, and intercedes for small business with procurement officers of the armed services.

Inequities?—This is the problem principally concerning SDPA now: In the present partial state of mobilization, there is a concentration of contracting in only a few areas —for tanks, airplanes and electronic instruments mainly. This means that many large concerns, loaded up with these contracts, are getting a lot of steel, copper and aluminum that normally would go to small firms. Unless help is given wisely, many of these small companies will be forced out of business—with great damage to the overall economy. That is what Mr. Taylor seeks to prevent.

Small business is applauding Mr. Taylor's blast against set-off restrictions often embodied in subcontracts. The set-off gives a prime contractor power to hold up on paying his sub to recover debts or claims due on other accounts. Subs trying to negotiate loans by putting up their subcontracts as collateral find banks reluctant to deal with them because of the clause.

Although the statute creating SDPA authorizes it to book contracts directly and sublet the work to small firms, this feature cannot be carried out until Congress approves the necessary appropriation, which probably will be in the early summer of 1952.

A Matter of Size—What is small business? The statute calls on SDPA to come up with a definition. Mr. Taylor says that considerable study will be needed on this particular angle. In the meantime he is inclined to regard as a good job the pamphlet entitled "Size Classification of Manufacturers" that was issued recently by the Commerce Department. It defines "small business" in each industry on the basis of number of employees in a given plant.

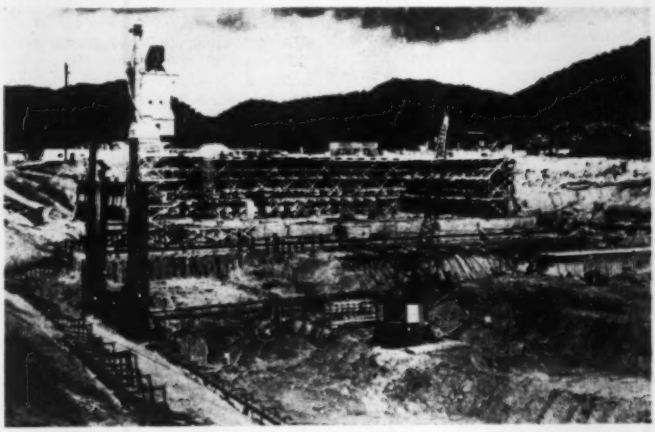
First quartered in the YMCA building and now at 900 Pennsylvania Ave. N. W., SDPA will be located permanently in the revamped old Washington Post Building shortly after Dec. 1.

Prospecting on U. S. Land . . .

Stepped-up assistance is to be given by the Interior Department to firms and individuals interested in prospecting for and developing mineral deposits on public lands. For this purpose a new Division of Minerals has been created within the Bureau of Land Management, with Lewis E. Hoffman as chief. Working with the new division in developing information about minerals on public lands are the Bureau of Mines and Geological Survey.

Electronics Clearing House . . .

Clearing house for information on reliability of electronic equipment produced by different manufacturers has been established by the Defense Department in its Research and Development Board. Another function taken on by RDB: Formation of a group on transistors to stimulate development of such apparatus. (For more about electronics, see p. 82.)



UP ON THE KANAWHA: A large generating plant, containing two 200,000-kilowatt units, goes up on the Kanawha river in West Virginia. The $40 million plant is one of two being built to meet growing power needs in Indiana, Michigan, Ohio, West Virginia, Kentucky and Tennessee. The other plant is on the Muskingum river in central Ohio

"We Cut Loading and Unloading Costs 75% with a BAKER FORK TRUCK"

"—also saved ourselves a costly construction job" —UNITED STOVE COMPANY, Ypsilanti, Mich.

(Above) This Baker Truck is equipped with a rollover attachment, neatly solving the problem of efficiently loading scrap into trucks for efficient disposal.

(Below) Loads are placed in highway trucks on castered skids from ground level, and pushed into position inside the truck.

● "Since our plant floor, shipping and receiving areas and shop yard are all on the same level, we faced the problem of either building a ramp and dock or finding some other means of getting loads into and out of highway trucks more quickly and economically. A Baker Fork Truck provided the answer. Besides eliminating the need for expensive rebuilding, with the resulting disruption in production, the truck helps us realize up to 75% in our loading and unloading operations, including scrap handling."

So says G. R. Reynolds, superintendent of United Stove Company. This company had been using Baker Trucks successfully inside their plant for many years. It was only natural that they should call on Baker when this new handling problem presented itself.

A Baker Representative will gladly help you solve similar problems in your plant.

BAKER INDUSTRIAL TRUCK DIVISION *of The Baker-Raulang Company*
1259 WEST 80th STREET, CLEVELAND 2, OHIO • *In Canada: Railway and Power Engineering Corp. Ltd.*

Baker® INDUSTRIAL TRUCKS

Worried about the Wire situation?

● Each day, the mobilization program brings new and tougher problems for users of wire.

So *our* biggest job now, as we see it, is to help you solve these problems. And as the world's largest manufacturer of steel wire, we believe we can do it.

On our staff, we've got some of the best metallurgists in the world. They've worked on thousands of wire application problems. And—here's the best part—a problem that is new to you may be old stuff to our engineers. Maybe you're using a wire that's unsuitable for the job it has to do. No matter what your problem, our metallurgists are qualified to recommend the best type of wire for the application, and they are always ready to cooperate with you.

Anyway, if you're having trouble, it doesn't hurt to find out if we can help you.

This offer of free advice and help is nothing new. But we think you'll agree that this is a good time to repeat the offer.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

AMERICAN MANUFACTURERS WIRE

AMERFINE—*High-quality fine wire.*

AMERSPRING—*music steel spring wire.*

AMERLOY—*alloy heading wire.*

AMERTEMP—*heavy-duty oil-tempered wire.*

AMERHEAD—*uniform heading wire.*

AMERSTITCH—*extra-tough metal stitching wire.*

AMERICAN
MANUFACTURERS WIRE

USS

UNITED STATES STEEL

Russia Pushes East German Production

Probably little direct armament output goes on in the Soviet zone, but production accelerates for tools, chemicals and vehicles that can be adapted for war

THE RUSSIANS are gearing East Germany's production capacity more and more to Soviet armament needs, although thus far blatant output of arms has been avoided.

The East Germans mostly have to produce machine tools and other equipment for armament plants in the Soviet Union. Most shipments to Russia are made as reparations. A plant at Meissen, for example, is making 40,000 special filters in 1951 for the production of synthetic nitric acid, essential in ammunition output.

Potentially for War—In East Germany's shipbuilding yards, mainly Rostock and Stettin, large numbers of small vessels are built that could serve as patrol or mine-laying boats. The engines and vital parts like crankshafts have been engineered for exceptional speed and strength. A former motor car builder has been commissioned to build a jeep-like vehicle usable on difficult terrain and for light transportation of troops or goods.

Further behind the iron curtain industrial production is undoubtedly increasing. The U. S. S. R.'s output percentages for the third quarter of 1951 are customarily vague, but they do indicate that the Communists are devoting increasing attention to turning out capital equipment and less and less consideration to consumer durable goods. The U. S. S. R. confesses that auto output in the third quarter fell 3 per cent below the target, that wood production was 10 per cent below expectations, that cotton growing fell 17 per cent below standards.

Just a Hint—A hint that Russia, like the U. S., can't get enough machine tools is the admission that tool production fell 1 per cent below the goal in the third quarter. According to U. S. S. R. claims it's the only capital goods category that didn't make the mark. Total industrial production is supposed to have exceeded the goal in the July-September period by 3 per cent.

Despite gains, Russia and her satellites still haven't enough industrial capacity even to approach the western nations' potential. One reason why an Austrian peace treaty hasn't been signed is that the Communists have covetous eyes on expanding industrial capacity in the western area of Austria. Apart from strategic political and face-saving considerations, Russia wants Yugoslavia because of increasing industrialization there. The nation will boost its steel producing capacity 25 per cent. Apparatus has been ordered from Westinghouse Electric Corp. that will help add more than 75,000 tons of pig iron to the annual capacity of Marshal Tito's blast furnaces, believed at present to be between 400,000 and 500,000 tons. Yugoslavia is also the recipient of a recent $25 million loan from the International Bank for Reconstruction & Development in the U. S., part of which will be used for industrial expansion.

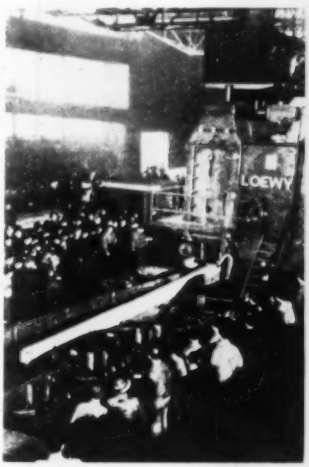
Reins Loosened on Ruhr

When the Schuman Plan to pool Western Europe's steel and coal resources goes into effect, all Allied restrictions on West German steel and coal production and all control measures for German heavy industry will be lifted.

Actually, that order is for only pyschological and political benefits because West German production now is rolling to the limits of its capacities, materials and skilled labor supplies.

Ruhr steelmen will have to reduce their exports from about 125,000 tons this month to 110,000 tons in December. All requirements of various steel consuming industries in the republic have been cut 20 per cent.

The scrap situation shows no improvement. The government director of a scrap control program has just resigned after the revelation that 180,000 tons of the material was exported without the knowledge of the authorities. The steel producers intend to establish a scrap trading company of their own, to the irritation of the regular scrap traders. Pressure mounts for removal of all scrap price controls.



ELECTRIFYING!: This electrically driven and controlled hot bloom and slab shear was placed in operation by the Alpine Montan Co. of Austria at their Donawitz plant. Exerting a shearing force of 1150 tons, the shear is driven by two 300-horsepower motors. It is an upcutting type shear and operates from the standstill without flywheels or clutch. Built by: Hydropress Inc.

Belgium: The Exception

Monthly Belgian steel production is averaging about 430,000 tons, compared with 290,000 tons earlier in the year.

Foreign demand accounts for the increase. The nation is one of the few major European countries whose exports are regularly exceeding imports. Its September trade surplus reached a record 2592 million Belgian francs. The average trade surplus for the preceding three months was Bfr 1453 million. The increase was due largely to a reduction in imports by almost Bfr 1000 million.

Dutch Spend for Trucks

The Netherlands will spend the equivalent of $46.1 million in counterpart funds for military goods to be produced in Holland, mainly for the nation's military use.

More Jap Steel Available

Japanese steel is reappearing on European, African, Latin American, Australian and Pakistan markets. Delivery dates are good, about 8 or 10 weeks.

The British have purchased 10,000 tons of wire rods from the Japanese and have another deal for 8000 tons pending. Some 10,000 tons of Japanese rolled steel products went to Sweden.

U.S. Sets Export Quotas

The Commerce Department's Office of International Trade has issued exports quotas for steel, copper and aluminum in the next quarter.

Total steel quotas for all export purposes are: 513,000 net tons of car-

bon steel (including 62,000 tons of steel plates and 24,000 tons of steel structurals); 22,500 tons of alloy steel; and 4 million pounds of stainless.

The total export licensing quotas for copper and copper base alloy are: 5,349,000 pounds of brass mill products; 4,865,000 pounds of wire mill products; and 221,000 pounds of foundry products.

The total export licensing quota for aluminum is 2 million pounds, of which 66,000 pounds is for foreign petroleum operations; 88,000 pounds for the Department of State; and 1,846,000 pounds for other foreign requirements.

Steel Trouble: Distribution

"It isn't shortage of steel that's the trouble. It's bad distribution."

So says A. B. Homer, president of Bethlehem Steel Co., who spoke before the Society of Naval Architects & Marine Engineers in New York. He believes the no-steel cry is a myth and that "there's all the steel the country needs, both for defense and to support a thriving civilian economy."

Mr. Homer urges that distribution of the metal be turned back to the steel industry, which is fully equipped to handle the situation.

The latest victim of the no-steel myth, the Bethlehem executive charges, is the shipbuilding program. Less than 1 per cent of steel plate and shape production for one quarter would be needed to continue the entire Mariner ship program, but the U. S. has suspended work on 15 of that class of ships because of insufficient steel.

Steel Industry Statistics

The 253 companies of the rapidly expanding iron and steel industry of the United States had 375 plants located in 31 states at the start of 1951, according to the American Iron & Steel Institute.

These companies operated 250 blast furnaces with capacity to produce 72.55 million tons of pig iron and ferroalloys, and 1,245 steelmaking furnaces with a capacity of 104.5 million tons. Employing 635,000 persons in the production and sale of iron and steel products during 1950, the companies met a total payroll of nearly $2.4 billion.

Pennsylvania, Ohio, Indiana and Illinois have the largest capacities for steel furnaces, blast furnaces and hot rolled products. Eighteen states have blast furnaces, 27 make ingots and 28 make hot-rolled products.

Consumer Goods Cut, but Not All the Way

Next quarter NPA will pare CMP tickets so that most civilian output will be less than half the pre-Korea rate. At least token production on all items will be possible

NPA FOR THE first quarter of 1952 will cut steel, copper and aluminum allotments so that production of consumer goods can be only half or less of the pre-Korean production.

The agency does hold some hope that more of the metals will be available by the second half of next year

DISTRIBUTION OF CONTROLLED MATERIALS TO CONSUMER TYPE PRODUCTS

Product	Carbon steel (short tons)	Alloy steel (short tons)	Stainless steel (pounds)	Copper brass mill products (pounds)	Copper wire mill products (pounds)	Copper foundry products (pounds)	Aluminum (pounds)
36213 Small Household Electric Appliances:							
Base period	20,360	574	1,961,922	3,695,835	1,104,393	109,690	11,550,614
1st Qtr. 1952 allotment	10,180	287	980,961	1,293,543	441,757	38,392	4,042,715
4th Qtr. 1951 issuance	10,863	445	662,360	1,773,735	713,474	72,463	5,391,402
35811 Washers:							
Base period	80,412	141	1,222,160	1,983,708	812,738	454,432	14,765,966
1st Qtr. 1952 allotment	40,206	71	611,080	694,298	325,095	159,052	5,168,089
4th Qtr. 1951 issuance	37,929	76	474,692	804,972	487,554	245,655	4,794,430
35812 Laundry Equipment, n.e.c.:							
Base period	26,748	257	129,619	139,247	96,336	32,235	943,738
1st Qtr. 1952 allotment	13,374	129	64,810	48,737	38,534	11,283	330,309
4th Qtr. 1951 issuance	13,207	293	44,308	96,849	92,551	19,537	322,650
35836 Sewing Machines:							
Base period	3,091	15	682	134,618	27,817	33,715	1,368,444
1st Qtr. 1952 allotment	1,545	8	341	47,117	11,127	11,801	478,956
4th Qtr. 1951 issuance	1,877	7	230	44,663	6,903	20,281	463,429
3589292 D & E—Household Service Machines:							
Base period	10,436	455	1,665,950	1,222,611	315,842	798,732	1,900,488
1st Qtr. 1952 allotment	5,218	228	832,975	427,914	126,327	279,557	665,171
4th Qtr. 1951 issuance	4,657	235	377,818	441,296	211,715	410,848	711,783
35841 Vacuum Cleaners:							
Base period	6,569	958	560,601	745,738	799,646	1,167	6,481,365
1st Qtr. 1952 allotment	3,255	479	280,301	281,026	319,858	409	2,268,478
4th Qtr. 1951 issuance	3,620	655	203,595	327,289	461,561	22,781	2,780,757
36211 Electric Fans:							
Base period	12,100	359	0	422,815	810,200	5,800	1,785,074
1st Qtr. 1952 allotment	6,050	180	0	147,986	324,080	2,030	624,776
4th Qtr. 1951 issuance	5,468	327	0	129,429	551,545	5,561	685,023
35852 Farm & Home Freezers:							
Base period	29,772	77	184,794	2,220,616	133,344	15,786	1,147,913
1st Qtr. 1952 allotment	14,886	39	92,397	777,216	53,338	5,526	401,770
4th Qtr. 1951 issuance	20,925	94	58,449	703,769	130,865	17,197	687,537
35851 Mechanical and Ice Refrigerators:							
Base period	247,410	1,393	5,814,639	13,051,757	1,313,521	75,838	22,993,288
1st Qtr. 1952 allotment	123,705	697	2,907,320	4,568,115	525,408	26,544	8,047,851
4th Qtr. 1951 issuance	120,773	1,052	1,663,721	5,064,069	1,101,896	60,826	7,707,812
34395 Heating Stoves & Space Heaters:							
Base period	36,141	568	347,752	380,875	4,797	58,088	442,508
1st Qtr. 1952 allotment	18,070	284	173,876	133,306	1,919	19,631	154,878
4th Qtr. 1951 issuance	20,726	154	218,559	177,155	6,101	37,949	178,381
34396 Domestic Cooking Stoves (Non-Electric):							
Base period	95,675	32	524,253	1,133,986	66,074	54,945	1,530,328
1st Qtr. 1952 allotment	47,837	16	262,126	396,895	26,430	19,231	535,615
4th Qtr. 1951 issuance	52,274	57	506,877	782,606	36,626	42,552	629,266
36214 Domestic Electric Cooking Stoves:							
Base period	63,161	1,334	2,891,959	568,279	608,513	15,704	3,407,516
1st Qtr. 1952 allotment	31,580	667	1,445,979	198,898	243,405	5,496	1,192,631
4th Qtr. 1951 issuance	32,053	97	1,834,984	310,791	350,347	8,941	1,185,139
34639 Cooking & Kitchen Utensils (Domestic):							
Base period	1,510	7	6,726,874	2,057,214	0	0	30,740,909
1st Qtr. 1952 allotment	755	4	3,363,437	720,025	0	0	10,759,318
4th Qtr. 1951 issuance	1,615	2	3,500,000	506,638	3,297	0	9,734,850
34211 Cutlery:							
Base period	2,885	208	2,626,606	478,570	0	0	37,500
1st Qtr. 1952 allotment	1,442	104	1,313,303	167,499	0	0	13,125
4th Qtr. 1951 issuance	1,734	183	1,309,633	197,685	0	590	24,132
34633 Galvanized Ware:							
Base period	24,191	0	87,280	0	0	0	58,564
1st Qtr. 1952 allotment	12,095	0	43,640	0	0	0	20,497
4th Qtr. 1951 issuance	17,023	0	209,050	0	0	18,000	70,120
3522092 Lawn Mowers:							
Base period	16,875	1,267	3,749	58,379	37,537	25,889	2,710,381
1st Qtr. 1952 allotment	8,437	633	1,874	20,432	15,015	9,061	948,633
4th Qtr. 1951 issuance	9,368	883	1,185	4,038	18,746	29,503	957,842
34895 Spring Wire:							
Base period	37,353	0	0	0	0	0	0
1st Qtr. 1952 allotment	18,677	0	0	0	0	0	0
4th Qtr. 1951 issuance	31,548	0	0	0	0	0	0
3988 Morticians Goods:							
Base period	15,440	596	8,000	1,010,592	93	324,994	142,915
1st Qtr. 1952 allotment	7,720	298	4,000	353,707	37	113,748	50,020
4th Qtr. 1951 issuance	9,082	183	4,480	292,114	47	88,883	19,236
3429691 Casket Hardware:							
Base period	4,378	186	0	48,314	0	13,558	16,253
1st Qtr. 1952 allotment	2,189	93	0	16,910	0	4,745	5,689
4th Qtr. 1951 issuance	1,093	101	0	10,853	0	3,891	2,387
2522 Metal Office Furniture:							
Base period	75,185	773	101,075	150,184	19,987	39,458	1,625,458
1st Qtr. 1952 allotment	37,593	387	50,538	52,564	7,995	13,810	568,910
4th Qtr. 1951 issuance	50,524	778	53,717	56,631	9,063	18,789	1,544,663
25310 Public Building Furniture:							
Base period	34,800	111	141,081	206,175	80	60,000	260,000
1st Qtr. 1952 allotment	17,400	56	70,541	72,161	32	21,000	91,000
4th Qtr. 1951 issuance	8,077	99	87,958	41,243	10,085	14,463	548,805

and that some of the cutbacks can be made less onerous.

Limiting Factor—The lowest allotments have been made to manufacturers of relatively less essential products using aluminum and copper and particularly brass mill products. Many manufacturers of such items are granted only 10 per cent of their base period usage of copper and 20 per cent of aluminum. More essential consumer products will be supported at levels ranging up to 35 per cent of their base period use of copper and aluminum. Steel allotments will average about 50 per cent of base for most products.

"The allotments reflect a decision not to impose a death sentence upon any product in the first quarter of 1952 and to sustain civilian production and employment at the highest possible levels compatible with the available materials," explains NPA Administrator Manly Fleischmann.

Succor—To help prevent shutdowns due to the low copper and aluminum allotments, NPA will give consideration to supplemental applications for carbon steel from those manufacturers who can use that material as a substitute for copper and aluminum. Although the steel supply is relatively better than either copper or aluminum, NPA emphasizes that only a limited amount of steel is available for supplemental allotments. Applications for supplemental steel allotments should be made by manufacturers to NPA immediately after they receive their first quarter material allotments.

Accompaning table shows the distribution of controlled materials among the major consumer-type products in the fourth quarter of this year and the first of next. Automobiles are excluded because that industry is treated separately on an individual-company basis. The data represents all allotments issued on applications received to date in Washington, but does not cover applications handled in field offices.

DISTRIBUTION OF CONTROLLED MATERIALS TO CONSUMER TYPE PRODUCTS

Product	Carbon steel (short tons)	Alloy steel (short tons)	Stainless steel (pounds)	Copper brass mill products (pounds)	Copper wire mill products (pounds)	Copper foundry products (pounds)	Aluminum (pounds)
25412 Cases, Cabinets, Counters:							
Base period	9,650	15	189,100	66,300	2,000	13,650	150,600
1st Qtr. 1952 allotment	4,825	8	94,550	23,205	800	4,778	52,710
4th Qtr. 1951 issuance	5,286	11	143,954	40,874	200	10,278	197,993
39094A Office Supplies:							
Base period	617	64	20,425	717,995	0	0	400,000
1st Qtr. 1952 allotment	309	32	10,213	251,298	0	0	140,000
4th Qtr. 1951 issuance	1,900	65	3,355	81,608	0	0	14,149
39640 Fasteners and Pins:							
Base period	4,243	6	22,969	13,166,555	0	29,788	887,389
1st Qtr. 1952 allotment	2,122	3	11,485	4,608,294	0	10,426	310,586
4th Qtr. 1951 issuance	7,053	171	219,241	7,576,772	0	70,656	800,238
39390 Misc. Musical Instruments & Parts:							
Base period	58	3	1,370	485,440	5,000	30,000	34,216
1st Qtr. 1952 allotment	29	2	685	162,904	2,000	10,500	11,976
4th Qtr. 1951 issuance	64	6	1,406	321,504	2,700	22,350	30,461
37511 Motorcycles & Bicycles:							
Base period	21,882	551	53,744	862,726	44,000	18,930	357,778
1st Qtr. 1952 allotment	10,941	276	26,872	301,954	17,600	6,626	125,222
4th Qtr. 1951 issuance	14,226	448	26,324	184,969	37,226	35,236	361,645
34212 Razors & Blades:							
Base period	1,872	10	39,000	507,006	0	0	190,985
1st Qtr 1952 allotment	936	5	19,500	177,452	0	0	66,845
4th Qtr. 1951 issuance	1,638	0	2,000	287,312	0	0	43,358
34213A Electric Razors:							
Base period	250	30	186	21,483	38,642	647	21
1st Qtr. 1952 allotment	125	15	93	7,519	15,457	226	7
4th Qtr. 1951 issuance	82	36	0	9,313	34,164	528	0
36612 Household Radio Receivers and Television Sets:							
Base period	39,550	36	62,008	1,477,490	3,976,780	31,900	2,367,795
1st Qtr. 1952 allotment	19,775	18	31,004	506,297	1,577,904	6,380	756,703
4th Qtr. 1951 issuance	22,299	52	29,036	515,301	1,696,533	18,772	1,200,632
34712 Portable Lamps:							
Base period	2,664	56	8,000	2,092,856	102,158	94,335	198,435
1st Qtr. 1952 allotment	1,465	31	3,200	209,286	35,755	33,017	39,686
4th Qtr. 1951 issuance	1,627	15	2,560	685,965	116,029	36,780	107,221
36993 Lighting Outfits, n.e.c.:							
Base period	167	0	0	440,495	531,517	0	19,604
1st Qtr. 1952 allotment	84	0	0	44,049	180,031	0	3,920
4th Qtr. 1951 issuance	106	2	0	172,916	287,224	0	7,200
34637 Stamped & Pressed Metal Products, n.e.c.:							
Base period	34,164	368	1,327,336	2,329,121	0	182,961	1,457,143
1st Qtr. 1952 allotment	18,790	184	663,668	232,912	0	18,296	291,429
4th Qtr. 1951 issuance	12,041	48	530,766	465,642	10,139	38,407	28,900
3489895 Wire Products, n.e.c.:							
Base period	15,780	0	18,587	175,385	0	0	39,615
1st Qtr. 1952 allotment	6,468	0	7,434	17,539	0	0	6,123
4th Qtr., 1951 issuance	11,822	0	45,598	81,676	0	0	7,662
39140 Hollow Ware:							
Base period	89	0	0	2,456,057	0	0	1,485,000
1st Qtr. 1952 allotment	89	0	0	245,606	0	0	297,000
4th Qtr. 1951 issuance	80	0	0	202,519	0	0	576,125
3514 Metal Household Furniture:							
Base period	139,316	13	616,276	92,425	0	78,834	3,018,250
1st Qtr. 1952 allotment	83,589	0	61,627	9,242	0	7,883	301,825
4th Qtr. 1951 issuance	63,119	30	71,239	209,624	0	56,126	2,033,623
3515 Mattresses & Springs:							
Base period	35,955	0	0	3,483	0	0	10,655
1st Qtr. 1952 allotment	17,977	0	0	0	0	0	3,729
4th Qtr. 1951 issuance	31,497	2	39,658	3,731	0	0	9,751
39410 Toys and Games (Except Models):							
Base period	19,528	327	1,534	308,393	60,700	0	1,209,584
1st Qtr. 1952 allotment	9,914	33	154	30,839	12,140	0	241,916
4th Qtr. 1951 issuance	29,450	203	400	72,636	31,554	0	494,531
39480 Sporting Goods (Except Fishing Tackle):							
Base period	22,000	455	531,580	106,554	77,800	49,726	358,144
1st Qtr. 1952 allotment	11,000	91	212,630	10,655	15,560	4,973	71,629
4th Qtr. 1951 issuance	8,465	318	198,608	98,300	3,842	26,096	280,255
39994D Lighters:							
Base period	458	7	102,392	622,734	2,580	0	34,428
1st Qtr. 1952 allotment	229	4	40,957	62,273	516	0	6,886
4th Qtr. 1951 issuance	196	0	35,582	287,096	2,580	0	6,288
39610 Jewelry:							
Base period	1,620	18	106,000	9,800,000	6	0	189,000
1st Qtr. 1952 allotment	1,215	6	53,600	980,000	0	2,392	37,800
4th Qtr. 1951 issuance	1,016	13	218,528	2,700,977	0	9,200	53,302
39994E Christmas Decorations:							
Base period	6	0	0	170,100	0	0	53,809
1st Qtr. 1952 allotment	3	0	0	17,010	0	0	10,762
4th Qtr. 1951 issuance	0	0	0	18,513	0	600	7,000
3439893 Luggage & Saddlery Hardware:							
Base period	3,497	5	67,643	1,280,675	0	100,500	155,600
1st Qtr. 1952 allotment	1,972	5	33,522	256,134	0	20,100	0
4th Qtr. 1951 issuance	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

n.a. Not available.

PAD Quarterly Allotments Set

Primary allotments by the Petroleum Administration for Defense for purchases of oil country tubular goods during the first quarter of 1952 were sent to 1855 oil and gas operators.

Some 2881 applications were received by the deadline for first quarter requests, but 1026 were not approved—one-third because the applications were defective, the others because the applicants did not qualify for primary allotments.

Of the 466,000 tons of casing and tubing allotted PAD, 272,000 tons will go to large operators, about 30,000 tons to field stocks to satisfy the needs of small operators, 22,200 tons for operators drilling wildcat wells, 35,000 tons for supplemental allotments and 57,750 tons for foreign petroleum operations.

Call for Engineers

Trumpeting for more engineers, California hopes to avert a shortage which threatens the defense program in that area.

Glen E. Brockway, defense manpower administrator for the Pacific Coast states, called upon employers, colleges, governmental agencies and engineering associations to co-operate in getting more engineers on the job. High schools were urged to encourage qualified students to enroll in engineering courses. Heads of engineering schools were asked to co-operate with employers in developing engineering extension courses.

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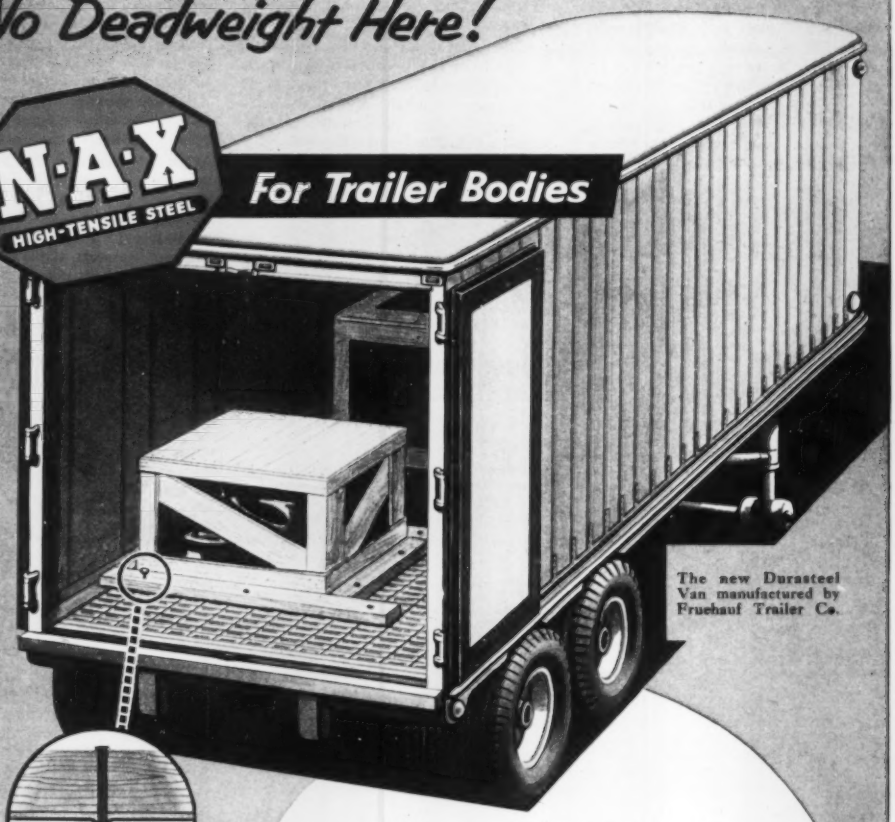

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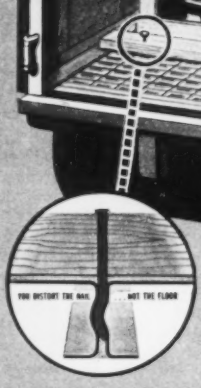

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NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

NPA's steel plate allotments to the auto industry will hurt truck output. The new machine tool orders will also pinch, but not as much as some people think

HOW COMPLETELY control of the automotive industry has been transferred to Washington has become crystal clear in the past few weeks.

"Tex" Colbert, president of Chrysler Corp., recently likened the government's actions to those of a back-seat driver who constantly dictates the path the car should take. This back-seat driver, however, is more and more frequently reaching forward and pulling the wheel around.

A Matter of Plates — The announcement by NPA that the auto-truck industry would be allotted only 60 per cent of its projected steel plate requirements in first quarter is a case in point. Obtaining plates has been one of the biggest problems for truck makers right along, and the government suggestion that they rely on conversion arrangements for a greater part of their requirements is met with heavy cynicism. Plates are a relatively small item for passenger car makers. Only about 45 pounds are contained in a typical passenger car, showing up mostly in the engine assembly with only about six pounds being used in the frame and a like amount in the body. Cutback in the allocation probably will not cut car production schedules. Some automakers have already changed their specifications to bar sizes from plates where only fractions of an inch separate the two products.

Another government action which created quite a stir but actually accomplished little was the order relating to unrated machine tool deliveries after Feb. 1. This was proclaimed by some as preventing future model changes. New engines, however, were quite effectively ruled out before this order was issued. Many automotive machine tool builders had cancelled out engine machinery orders they had, and were making no bones to automakers that they had no idea when they could get going again on unrated orders. One projected new engine—Dodge's V-8—is the only one believed stymied by the order. Ford's V-8 and Mercury engines had apparently come a cropper before the order came out.

Auto, Truck Output
U. S. and Canada

	1951	1950
January	645,688	609,879
February	658,918	505,593
March	802,737	610,680
April	680,281	585,705
May	695,898	732,161
June	653,682	897,853
Six Mos.	4,137,204	3,941,878
July	522,858	746,801
August	571,442	842,335
September	505,758	760,847
October	548,350*	796,010
November		833,784
December		671,622
Week Ended	**1951**	**1950**
Oct. 27	121,215	188,230
Nov. 3	118,743	177,122
Nov. 10	117,342	161,038
Nov. 17	120,026	122,498
Nov. 24	90,000*	122,683

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Misunderstood — The order has been misinterpreted as preventing body changes, which it does not do. That is to the vast relief of many die and fixture shops who, though loaded with defense work at present, expect to see a tapering off of this activity as far as they are concerned, and the development of a partial vacuum in their operations unless civilian design changes continue to be made.

Never Satisfied

The guiding principle which shows up everywhere in the automotive industry is never be satisfied with what you've got. The matter of sheet steel for automobile bodies is an area where the automakers quite frequently register their dissatisfaction. Both sides of this controversy were aired in a discussion before the Detroit chapter of the Society of Automotive Engineers last Monday, with H. J. Cutler, chief metallurgist, Lackawanna Plant, Bethlehem Steel Co., representing the steel industry, and E. S. MacPherson, chief engineer, Ford Motor Co., the automakers.

A little on the defensive, Mr. Cutler pointed to the improvements in sheet making which have brought to the auto industry its ability to make deep-drawn parts which a generation ago were completely out of the question. "An optimistic attitude for the future is justified by the vast improvement that has been witnessed in the past," he declared, mentioning "it would be unwise and hazardous to say that the ultimate has been reached." Although reaching these conclusions, he nevertheless warned that chemical composition of deep drawing sheets probably will not be improved in the forseeable future, that in fact the problems of alloy residuals will probably worsen. Surface defects also will continue to be present and a source of annoyance for users into the forseeable future, with these continuing to be more prevalent in coil stock than in sheets.

Mr. MacPherson had seven gripes with sheet steel as it affects automakers. First was with the tolerance on commonly used gages. The 10 per cent tolerance could amount to 60 needless pounds of weight on an average car. A lesser tolerance, he said, would be desirable. On wide sheets extra thickness is frequently found at the center and in coil stock gage varies along the length of the coil. His next complaint was against the extra charge for drawing quality.

Variation in drawing quality steel is another sore spot. "Too often it is found that after sheets have been blanked they have inadequate drawing quality and must

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be salvaged," he said. Another automotive need is for thinner steel of good deep drawing quality at no extra cost. As an example, he said 21 gage would be used in preference to 20 gage in some locations if its drawing characteristics were as good. Also needed is sheet free from surface imperfections. This, he said, may result from cropping too little of the ingot. Parting shot was against the limited availability of sheets over 72 inches wide and their extra cost.

Admitting that "we cannot expect relief from some of these things" during a steel shortage period, Mr. MacPherson said that "these improvements . . . may only be brought about at a time when it can be said that there is real competition in the steel business—when demand is less than available capacity." And twisting the oft-repeated phrase around he suggested to steel men "in time of war, prepare for peace."

Chrysler K-310 Unlike Le Sabre

It's a mistake to think of the new Chrysler K-310 as in the same category as General Motors' "Le Sabre" and Buick Division's XP-300.

Though called by Chrysler officials an experimental car, it contains few gadgets or mechanical innovations. It could be manufactured in limited quantity. The two GM cars, on the other hand, are loaded with gimmicks, so much so in fact that both are reportedly undependable because of "bugs." These difficulties are not unexpected, and to find out what they would be and iron them out is one purpose of the GM "laboratories on wheels"—Le Sabre and XP-300.

Not So Startling—The K-310 is not quite as startling a car, appearancewise, as the two GM vehicles, both of which are two-seater convertibles. It, however, is an eminently more practical car, if "practical" is suitable terminology for an automobile which is capable of running upwards of 150 mph and would undoubtedly cost in limited volume in the neighborhood of $10,000. It has a hard top, seats five, although tall people would find the rear seat cramped.

The car, which started out as a package in which the company's "hot-rodded" version of its V-8 firepower engine would be contained, is an American company's answer to the challenge of high-speed foreign cars. Its lines are unconventional and superficially of foreign origin. Actually the car was styled and designed throughout in Chrysler's Highland Park engineering offices. Its body was built to Chrysler specifications by Carrozzeria Chia of Turin, Italy, and mounted on a chassis which Chrysler had supplied.

Powerful Engine—The car presently is equipped with Chrysler's 180-hp engine; it has been designed to mount either this engine or the 310-hp engine which differs in surprisingly few respects from the 180-hp production job. Unsupercharged, its changes include enlargement of the intake and exhaust ports, redesign of manifolding, carburetion and camshaft. Compression ratio is 8.1 to 1. Displacement is 331 cubic inches. The engine mounts four carburetors, and is designed to operate on ordinary premium grade gas, turning out 310 hp at 5200 rpm.

Overall, the car is 220½ inches long with a 125½-inch wheelbase. It is 59 inches high. It presently has 17-inch wheels although these may be replaced with 18 inchers, a concession to experience with this size tire on the Indianapolis Speedway. Wire wheels are used, partly, according to the designers, to permit adequate brake cooling, and partly for appearance.

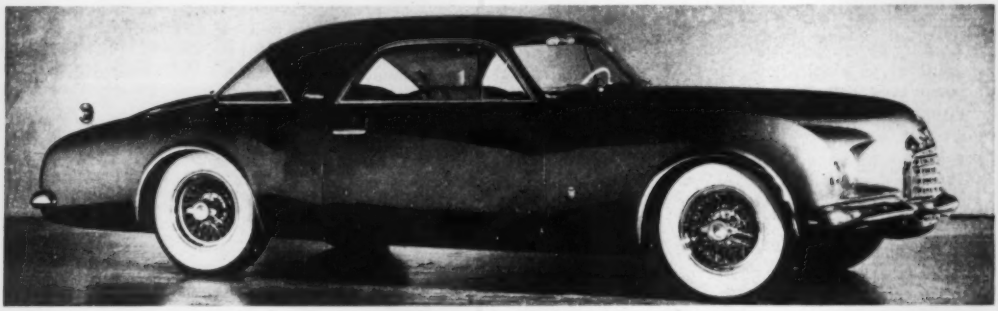
Not Gaudy—One of the notable features exteriorwise is the discreet use of chrome. Aside from a chrome rim on the fenders around the wheel openings, chrome wheel spokes, bumpers and grille, and window moldings, the car is practically free from ornamentation.

The body has been executed in aluminum, and present indications are that if the car is put into production the bodies will come from Italy for assembly here.

Undecided—Whether the car will be produced for sale has not been decided. K. T. Keller, board chairman, says: "There are a lot of things that have to be known before I will say go ahead and build any." He told newsmen seeing the K-310 for the first time that he had refused an offer of $400,000 for it "because I think it is worth more than that to us."

Sears To Sell New K-F Cars

The "new" car to be sold through Sears, Roebuck stores in 17 southern cities before Christmas under the name "Allstate" is understood in Detroit circles to be a duplicate of the Henry J with only the name changed. Kaiser-Frazer president, Edgar F. Kaiser, said no change would be involved in marketing Kaisers, Henry Js.



CHRYSLER'S K-310 FIVE-PASSENGER HARD TOP
. . . $400,000 won't buy this one, but production models may follow

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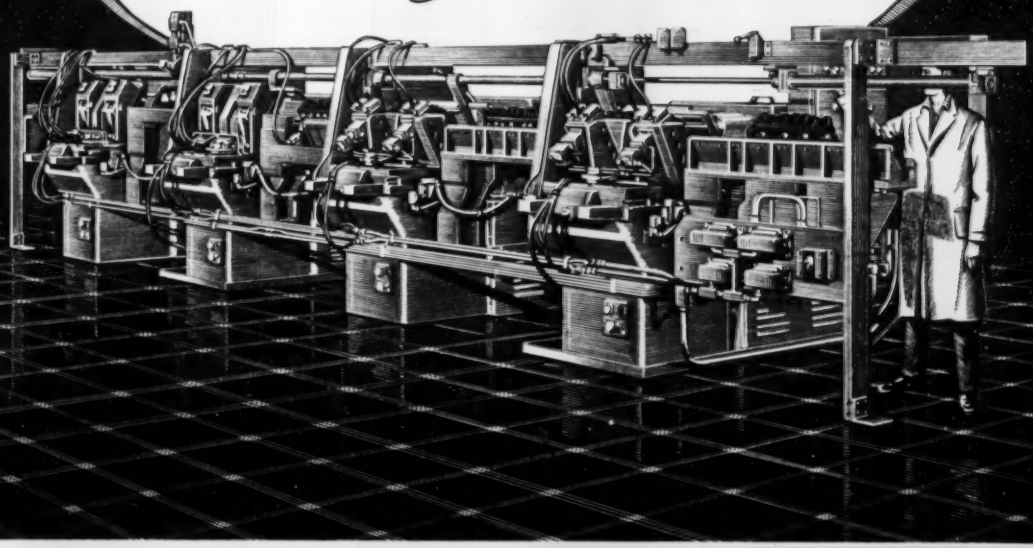

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There are methods for stepping up production of such items as coal, coke, limestone and ore to get the amounts required to continue the pace. BUT — WE MUST HAVE MORE SCRAP! Scrap is the vital ingredient. If the shortage continues, steel companies will never operate the new facilities now being built.

The mills have made every effort to reclaim production scrap. The steel industry is expanding so rapidly that normal scrap return cannot possibly produce enough to keep the industry at its peak. The real drive is for what is known as "dormant" scrap — the obsolete machinery of industry — spare parts, broken equipment that will never be called for or used again. Other companies are successfully releasing such scrap. You can, too.

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The Business Trend

Holidays and winter weather put skids under industrial production index. Defense deliveries must be speeded to make up for first-quarter civilian cutbacks

STATE of business is becoming increasingly dependent on mobilization's timetable and how closely it is followed.

To keep total production on an even keel, defense goods output must make up for cutbacks in civilian lines. It'll take some doing to achieve this balance with first-quarter civilian goods production slashed to about half the pre-Korea level. Weapons deliveries are still wearing the "little and late" tag; from all indications the snail's pace of deliveries won't be speeded much in first quarter. Hampering this defense business are such factors as scheduling problems, design changes, materials shortages and labor troubles.

Creeping gains in durable goods output only slightly offset drops in production of nondurables in October. These gains caused a one-point rise in the Federal Reserve Board's industrial production index for that month (to 220 per cent of the 1935-1939 average, highest mark since June).

Winter weather and holidays are playing hob with November production: STEEL's industrial activity index slid downhill seven points in two weeks. Latest reading (week ended Nov. 17) pegged the index at 210 per cent of the 1936-1939 average. It is unlikely that November or December activity will cause any considerable gain in total production, although several weeks yet this year will be especially busy ones.

Dip in GNP . . .

Gross national product, value of the nation's output of goods and services, declined in the third quarter for the first time since mobilization began, says the Commerce Department. In the three months ended Sept. 30, GNP was at an annual rate of $327.6 billion. In the second quarter it was at an annual rate of $327.8 billion. Sharp increases in GNP have been seen in every other quarter since the defense program began. Slack midsummer production was primarily responsible for the third-quarter dip. In 1951's first nine months, the nation produced at an annual rate 15 per cent above the 1950 period; about half this increase is traceable to higher prices.

Steel Pace Continues . . .

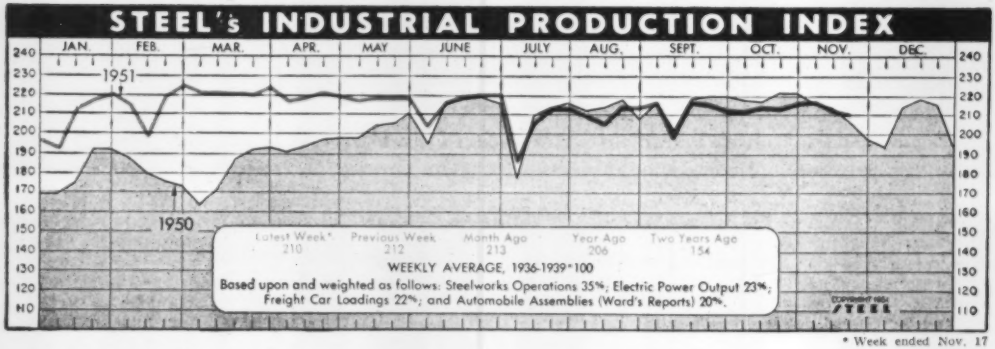
Stabilizer of industrial production at high levels throughout 1951 has been steady operations of the nation's steel mills. While the industry and government argue about extent of the steel shortage and how much capacity is needed to fill demands, furnaces keep spewing forth record tonnages at sustained above-capacity rates. Tonnage produced per week has been consistently over 2 million tons. In the week ended Nov. 24, schedules called for 2,073,000 tons of ingots and steel for castings to be poured. Output in the previous week was 2,021,000 net tons.

Autos Out of Gas . . .

Shutting down of assembly lines from last Thursday until today was

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	101.0	101.5	100.5	102.5
	Electric Power Distributed (million kilowatt hours)	7,290	7,396	7,149	6,728
	Bituminous Coal Production (daily av.—1000 tons)	1,900	1,886	1,828	1,857
	Petroleum Production (daily av.—1000 bbl)	6,190	6,203	6,353	5,882
	Construction Volume (ENR—Unit $1,000,000)	$312.9	$159.5	$195.2	$214.9
	Automobile and Truck Output (Ward's—number units)	120,026	117,342	120,810	126,019
	*Dates on request. †Weekly capacities, net tons: 1951, 1,999,035; 1st half 1950, 1,906,268; 2nd half 1950, 1,928,721.				
TRADE	Freight Car Loadings (unit—1000 cars)	725†	791	887	837
	Business Failures (Dun & Bradstreet, number)	155	150	157	170
	Currency in Circulation (in millions of dollars)‡	$28,601	$28,534	$28,385	$27,296
	Department Store Sales (changes from like wk. a yr. ago)‡	+6%	+11%	+5%	+7%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—(millions)	$13,797	$15,182	$15,366	$16,319
	Federal Gross Debt (billions)	$257.9	$257.8	$257.0	$256.9
	Bond Volume, NYSE (millions)	$9.5	$10.5	$15.5	$25.1
	Stocks Sales, NYSE (thousands of shares)	5,122	6,041	9,365	9,871
	Loans and Investments (billions)†	$72.3	$72.6	$71.1	$69.4
	United States Gov't. Obligations Held (millions)†	$31,596	$31,926	$30,864	$33,392
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	171.92	171.92	171.92	157.76
	STEEL's Nonferrous Metal Price Index‡	234.9	234.9	234.9	239.5
	All Commodities†	177.2	177.2	177.7	171.8
	Metals and Metal Products†	190.9	190.9	190.9	180.0
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1951
1950
Latest Week* 210
Previous Week 212
Month Ago 213
Year Ago 206
Two Years Ago 154
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
STEEL

* Week ended Nov. 17

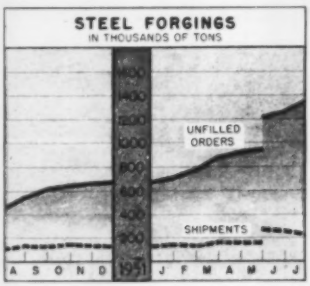
accomplished by most major auto producers. They would have to cease assembly sometime this month to keep within unit limitations, so they figured that last Friday would be the best time, particularly so because it fell within hunting season. Output in U. S. plants for that week was expected to drop below 60,000 units. Combined U. S.-Canadian production in the week ended Nov. 17 compared favorably with year-ago completions for the first time since NPA controls began. Auto-truck assemblies, 120,026 in that week, were only 6000 below the same 1950 period, when several major producers closed for model changeovers. Walkouts and other disputes in suppliers plants are clouding the future for car and truck builders, says *Ward's Automotive Reports*.

Buyers Less Optimistic . . .

The usual fall business improvement was not evidenced in October say members surveyed by Purchasing Agents Association of Chicago. Deliveries are relatively slow and prices are going up, members report, neither of which will bring about better business conditions. Inventories probably are not decreasing as fast as some firms would like to see them. Order backlogs are still decreasing, employment remains high and production shows a slight increase, the survey shows. Buying policy hasn't changed, with two-thirds of reporting members buying 60 days or less. Members, hoping that improvement may materialize yet this year, fear that higher taxes and their adverse effects on volume and profit may thwart seasonal improvement.

Houses Push Million Mark . . .

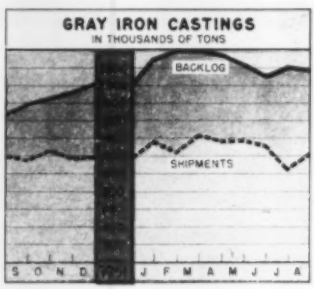
With 86,000 housing starts in October reported by the Bureau of Labor Statistics, it's a cinch that 1951 housing will top the million-start mark. Less than 30,000 units need be started



Steel Forgings
Thousands of Net Tons

	Shipments		Backlogs	
	1951	1950	1951	1950
Jan.	138	93	709	327
Feb.	129	93	781	341
Mar.	161	109	875	350
Apr.	154	99	924	357
May	266*	114	1,208*	373
June	249*	117	1,264*	408
July	220*	95	1,361*	446
Aug.	...	124	...	548
Sept.	...	122	...	620
Oct.	...	137	...	643
Nov.	...	130	...	657
Dec.	...	128	...	674

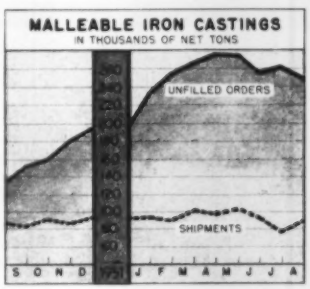
U. S. Bureau of the Census. *Data for these months based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more. Previous data based on reports from commercial forge shops producing 3600 tons or more per year.



Gray Iron Castings
Thousands of Net Tons

	Shipments		Backlogs*	
	1951	1950	1951	1950
Jan.	1,364	913	2,298	914
Feb.	1,234	864	2,392	873
Mar.	1,440	996	2,390	922
Apr.	1,363	981	2,337	922
May	1,396	1,095	2,229	978
June	1,309	1,136	2,162	1,040
July	1,029	961	2,208	1,287
Aug.	1,219	1,202	2,170	1,670
Sept.	....	1,159	....	1,794
Oct.	....	1,255	....	1,840
Nov.	....	1,161	....	1,930
Dec.	....	1,182	....	2,012
Total	....	12,905		

* For sale. U.S. Bureau of the Census.



Malleable Iron Castings
Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1951	1950	1951	1950
Jan.	92.5	62.9	234	62
Feb.	89.0	60.4	255	67
Mar.	101.7	66.3	267	70
Apr.	97.3	69.8	276	76
May	100.8	76.2	275	77
June	93.7	82.3	256	87
July	76.8	67.5	263	105
Aug.	90.7	86.0	249	132
Sept.	.....	82.5	...	153
Oct.	.....	90.0	...	160
Nov.	.....	85.2	...	180
Dec.	.....	91.5	...	195
Total	....	920.6	...	...

* For sale. U.S. Bureau of the Census.

Charts—Copyright 1951, STEEL

in November and December to reach that level; in the first ten months of this year 942,500 non-farm dwellings were started. That's 22 per cent below the like 1950 period, though. October starts dipped 5 per cent from September because of slowdowns in the South and on the West Coast. Total new construction dropped in October also, reports the Federal Reserve Board, but plant and equipment expenditures in the third quarter were estimated at a new record high. Latest industrial construction awards (week ended Nov. 15) rocketed to $118.7 million, triple the volume of the preceding week. In the first 46 weeks of 1951, industrial awards add up to $3783 million.

Gas Appliances Perk Up . . .

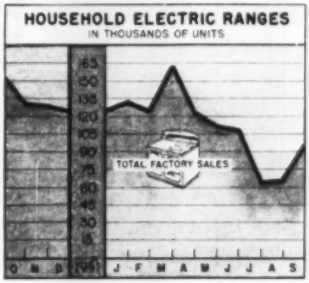
Though far off their 1950 production pace, gas appliance manufacturers are enjoying their highest output rate since spring. Gas Appliance Manufacturers Association reports shipments of domestic gas ranges approximated 206,800 units in October, up 24,000 from September and the highest monthly output since April. In the first ten months this year, about 2,009,800 gas ranges were shipped, well below the 2,518,200 shipped in the same period last year. About 157,700 automatic gas water heaters were shipped in October, making a total of 1,672,200 units in the first ten months of 1951, as against 235,100 and 1,954,600, respectively, in last year's same periods.

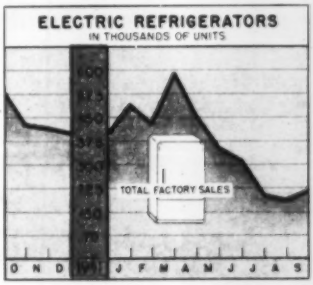
Trends Fore and Aft . . .

New Bureau of Labor Statistics' wholesale price index coming out in January will cover 2100 commodities, more than double the present numbers (900) and will use 1947-1949 as base. Nearly all government indexes will be based soon on postwar averages . . . 51.5 million tons of soft coal were mined in October . . . Consumer spending is reviving again and retailers expect a Christmas onslaught greater than ever before . . . Commerce Department has expanded its steel forgings shipments coverage (see chart) to include captive as well as commercial shops.

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction Oct.29	Furnaces, W. Air ..Nov.19	Radio, TV Nov.12
Durable Goods Oct.8	Gear Sales Nov.5	Ranges, Gas Oct.29
Employ., Metalwkg. .Nov.12	Indus. Production..Nov.19	Steel Castings Oct.22
Employ., Steel Oct.29	Ironers Nov.5	Steel Shipments ...Nov.5
Fab. Struc. Steel...Nov.12	Machine Tools Nov.5	Vacuum Cleaners ...Oct.29
Freight Cars Nov.19	Prices Nov.19	Wages, Metalwkg. ..Oct.22
Foundry Equip. ...Nov.12	Pumps, New Orders.July9	Washers Nov.5
Furnaces, Indus. ..Nov.12	Purchasing Power ..Oct.8	Water Heaters Nov.19





Household Electric Ranges
Total Factory Sales—Units

	1951	1950	1949
Jan.	132.437	97.925	109.919
Feb.	123.953	118.989	88.333
Mar.	162.267	145.417	88.934
Apr.	122.803	132.859	60.739
May	109.572	145.498	52.881
June	107.861	158.534	69.107
July	62.713	130.505	63.249
Aug.	64.874	132.243	66.753
Sept.	96.182	156.216	93.045
Oct.	.....	130.452	73.312
Nov.	.....	129.384	60.523
Dec.	.....	124.360	77.011
Total ...	.....	1,602,382	903,806

National Electrical Mfrs. Assoc.

Electric Refrigerators
Total Factory Sales—Units

	1951	1950	1949
Jan.	488,607	375,856	396,329
Feb.	423,420	461,256	348,539
Mar.	591,449	586,293	382,861
Apr.	445,636	546,279	335,092
May	348,423	542,865	341,933
June	309,125	549,740	310,780
July	199,616	507,029	327,429
Aug.	187,603	518,359	314,839
Sept.	215,459	535,002	326,149
Oct.	.....	420,431	265,575
Nov.	.....	411,201	230,258
Dec.	.....	394,268	272,636
Total ...	.....	5,848,579	3,852,420

National Electrical Mfrs. Assoc.

The fact that *so many* manufacturers find there are Pheoll stock fasteners that meet exact needs — makes Pheoll stocks the ***one source*** for you to depend on, too. Our wide range of sizes, metals and finishes simplifies assembly problems; speeds production—because **fasteners that fit, make jobs go faster!**

Pheoll rolled threads and cold formed heads provide maximum structural strength to meet stress and strain. Snug thread mating surfaces assure greater contact with more lasting grip—adding life and service to your assembled products.

The extra fine head and thread finish of Pheoll quality fasteners improves the salability of your product. They help "dress up" the job! You can select from a wide variety of attractive head types in screws for metal, wood and plastics—nuts with single or double chamfer in various metals and finishes.

Write for Additional Information and Price List.

MAKE PHEOLL YOUR SOURCE FOR: Samst • Thread Cutting Screwst • Threaded Rods • Wood Screwst • Machine Bolts • Cap Screws • Stove Boltst • Thumb Screws • Machine Screwst

†*Furnished in slotted and Phillips Recessed Head Types*

Pheoll MANUFACTURING COMPANY
3700 ROOSEVELT ROAD
CHICAGO 50, ILLINOIS
SCREWS • BOLTS • NUTS
Industrial Fasteners and Holding Devices

famous blades

...The sword of the CRUSADERS

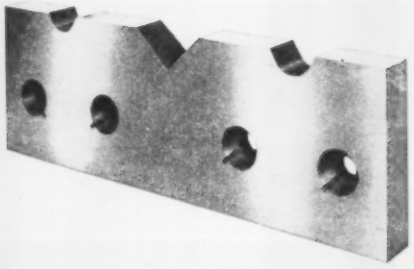
Strong blades for powerful warriors

The two-handed swords of the ancient Crusaders were tremendous weapons. The blades approached six feet in length and were double-edged.

Only the strongest warriors were capable of lifting and wielding these huge swords with great swinging strokes. In the hands of one of these powerful knights, the sword possessed great shearing and stunning power. Such blades required the best of steel and expert forging by the most highly skilled armorers.

...Heppenstall SHEAR KNIVES

Strong blades for the tools of industry



Modern metal cutting, shearing, and trimming operations call for Shear Knives of the most dependable quality and proven reputation for durability.

Heppenstall has been producing Shear Knives to the highest standards for many years. Made from high quality, electric induction steels, these long-lasting knives are famous wherever hot and cold, ferrous and non-ferrous metals are cut or sheared.

Records of performance taken from plants where these knives are in daily use show such production advantages as:

- MORE CUTS BETWEEN GRINDS
- MORE UNITS PER BLADE
- LOWER OVERALL BLADE COST
- INCREASE IN PRODUCTION

Many leading plants make Heppenstall their standard specification for Shear Knives . . . and, these famous blades can do just as good a job for you. Make them *your* standard specification—today.

Heppenstall

the most dependable name in forgings

PITTSBURGH 1, PENNSYLVANIA

Sales offices in principal cities

Men of Industry

LEONARD W. BUGHMAN
. . . elected a V. P.-Great Lakes Carbon

RALPH R. KELLEY
. . . joins Brooks & Perkins Inc.

ALFRED LIPPMAN JR.
. . . gen. mgr. of Commonwealth labs

Leonard W. Bughman was elected a vice president, **Great Lakes Carbon Corp.**, New York. Prior to joining the corporation in 1949 he was assistant vice president, Union Spring & Mfg. Co. In addition to continuing in sales activities for the electrode division, Mr. Bughman will give special assistance to all product divisions in the field of customer relations. He remains at the Pittsburgh office. **John J. Dowdle III** and **Bartley J. Fleming** of the New York offices, and **Willis P. Tuller** of the Chicago office, were also named vice presidents of the firm. Mr. Dowdle rejoins the company as assistant to the president. Mr. Fleming continues as director of personnel and Mr. Tuller as director of traffic.

Dr. Walther Matheslus, who retires as president of Geneva Steel Co. on Dec. 1, will become a consultant for **Freyn Engineering Department,** Koppers Co. Inc., and will be located in Chicago, Freyn headquarters.

Gus G. Sutter was elected president of the newly organized Chicago plating firm of **Metro Electro Processing Corp.** Other officers are **Tom W. Graff,** vice president, and **Sam Yokley,** secretary-treasurer. Mr. Sutter also is president of Pioneer Plating Co.

A. Bruce Mainwaring was appointed plant superintendent, **Uniform Tubes,** Collegeville, Pa.

Harry R. Hemmings was appointed manager of the Buffalo Tube Works of **General Electric Co.,** Buffalo. He was formerly purchasing supervisor for cathode ray tubes at GE's electronics plant in Syracuse, N. Y.

Ralph R. Kelley joined **Brooks & Perkins Inc.,** Detroit, as general superintendent of the new magnesium rolling mill, to be called the Livonia Mill Division. He will have charge of the casting of magnesium slabs and rolling of sheet and plate, production of which is expected early in 1952. Mr. Kelley was formerly with Aluminum Co. of America.

Quigley Co. Inc., New York, elected new officers: **D. F. McMahon,** formerly president, is now chairman of the board. **J. A. Mulcahy,** treasurer, was elected president-treasurer. **G. B. Quigley** was elected secretary; **R. J. DeMaison,** vice president in addition to technical director. **S. F. Murphy Jr.** is first vice president in charge of sales, and **H. T. Thayer** is vice president and chief engineer.

Nelson E. Walker was appointed assistant district sales manager, Cleveland district, **Republic Steel Corp.** He joined Republic Iron & Steel Co., predecessor company, in 1928. For the last five years he has been with the Cleveland district sales office in charge of all product sales in Columbus, O.

Sharon Steel Corp., Sharon, Pa., appointed **John Bidner** assistant to the general superintendent. He will be responsible for co-ordination of melting practice in the company's two steel plants and for effective use of raw materials required in these operations. Mr. Bidner was open-hearth superintendent at the company's Roemer Works, and is replaced there by **Francis J. Herman. Raymond C. Oswald** becomes assistant open-hearth superintendent.

Commonwealth Engineering Co. of Ohio, Dayton, named **Alfred Lippman Jr.** general manager of its laboratories. He was with Bay Chemical Co., a division of Morton Salt Co., for 19 years, the last 12 of which he was manager in charge of production, research and development.

B. W. Wild was appointed assistant works manager of **Columbia Machinery & Engineering Corp.'s** Hamilton, O., plant. Before joining Columbia he was master mechanic of Bendix Aviation Corp.'s South Bend and Hamilton plants.

A. J. McAllister, former president-general manager of Fairfield Mfg. Co., has joined **Borg-Warner Corp.** as president and general manager of its Detroit Gear Division. He succeeds **Howard E. Blood** who was president of Detroit Gear since 1923 when it was a separate company, as well as since 1929 when it merged with Borg-Warner. Mr. Blood continues as a vice president and director of the parent company, and also assumes charge of the new products development laboratory which Borg-Warner is establishing in Detroit. **D. T. Sicklesteel,** former vice president, engineering, Detroit Gear, was named general manager of the new lab at Detroit which will develop new and improved types of automatic transmissions and other products.

Kenneth L. Holmes was made purchasing agent, and **E. O. Mitchell,** assistant purchasing agent of **Chicago Pump Co.,** Chicago.

W. J. Rashleigh joined **Unistrut Products Co.,** Chicago, in an executive

sales capacity. He was with Sylvania Electric Products Inc.

Henry G. Chiles, assistant sales promotion manager, piston ring department, **Koppers Co. Inc.,** Pittsburgh, was made manager of sales promotion and advertising of that department. He succeeds **C. B. Riddick,** resigned to enter business for himself.

John J. Kelley was appointed district manager of sales for the new office opened by **Pittsburgh Screw & Bolt Corp.** in Detroit. He formerly was sales engineer in the Pittsburgh office.

Edward D. Murphy resigned as vice president of **National Can Corp.,** New York, after 31 years' association. He remains as a director and will be retained in a consulting and advisory capacity.

American Pulley Co., Philadelphia, appointed **Harry W. Gordon** Northwest district manager. His headquarters are in Seattle. **Sidney H. Hewett** becomes district manager, Detroit area, with headquarters at Plymouth, Mich.

Luis E. Eckelmann, manager, metal finishing division, was elected vice president of **Pyrene Mfg. Co.,** Newark, N. J. He will be in general charge of development work as well as of metal finishing.

E. C. Klotzburger was appointed manager of General Motors Corp.'s new dual-purpose plant at Arlington, Tex., where the **Buick-Oldsmobile-Pontiac Division** has a letter contract to produce a Grumman-designed airplane for the Navy. The plant will be built on a 255-acre site between Dallas and Ft. Worth, and also will have capacity for assembly of B-O-P passenger cars. **W. J. Croxson** succeeds Mr. Klotzburger as manager of the B-O-P assembly division's Linden, N. J., plant. He was production manager of the division's South Gate, Calif., assembly plant.

L. A. Roe was appointed director of the mining and metallurgical section, **Bjorksten Research Laboratories Inc.,** Madison, Wis. He was technical supervisor of ore research at Jones & Laughlin Steel Corp.

Wladimir P. Lewicki was appointed works manager of **Southwest Steel Rolling Mills,** Los Angeles.

Russell G. Whittemore was appointed acting director, product development department, **Pittsburgh Plate Glass Co.'s** glass division, Pittsburgh. He succeeds **J. Hervey Sherts,** recently named general manager of the firm's new fiber glass division.

Graybar Electric Co. Inc. appointed **W. T. Bronson** manager of its Lansing, Mich., branch; **W. V. Quigley,** operating manager at Providence, R. I.; and **M. E. Lee,** operating manager at Aberdeen, S. Dak.

Milton K. Grey, former sales manager at **Benchmaster Mfg. Co.,** Los Angeles, returns to the company in that capacity and also becomes general manager.

Detroit Electric Furnace Division, **Kuhlman Electric Co.,** Bay City, Mich., appointed **Robert C. Anderson** sales engineer. He has been a sales representative at Buffalo for Joseph Dixon Crucible Co.

Leroy A. Van Bomel was elected a director of **Chrysler Corp.,** Detroit.

Mark C. Stebbins was appointed sales representative for **Soss Mfg. Co.'s** invisible hinges in Michigan and in Toledo, O. He succeeds **Lowell Myers,** resigned.

William W. Timmis Jr. was appointed southern sales and service manager for **Dravo Corp.'s** heating department. He will be located in Atlanta.

Benjamin Sampson, sales manager, **K. H. Huppert Co.,** Chicago, was elected vice president. He continues supervision of sales as well as co-ordination of sales, engineering and manufacturing.

Oliver Corp. appointed **T. H. Morrell** chief engineer at the Charles City, Iowa, plant to succeed the late **Louis A. Gilmer. P. Y. Burns** was advanced to assistant chief engineer and is succeeded by **Homer Dommel** as supervisor of experimental engineering.

Ellis T. Beck is the new eastern district manager of **Votator Division,** Girdler Corp., Louisville. He succeeds **Samuel Welch,** resigned.

Herman B. Robbins was named sales manager, Generator Set Division, **John Reiner & Co.,** New York. He also will be in charge of the company's export activities.

Clinton K. Royce, who recently resigned as head of the packaging section of the Department of Navy's Office of Naval Material, will join the staff of **Vanant Products,** Milwaukee.

Newlin T. Booth Jr. was elected president, **Deemer Steel Casting Co.,** New Castle, Del. He succeeds his father, the late **Newlin T. Booth. Mrs. Newlin T. Booth Sr.,** widow of the former president, was elected vice president; **George B. Harvey,** secretary; and **Jacob H. Speicher,** treasurer.

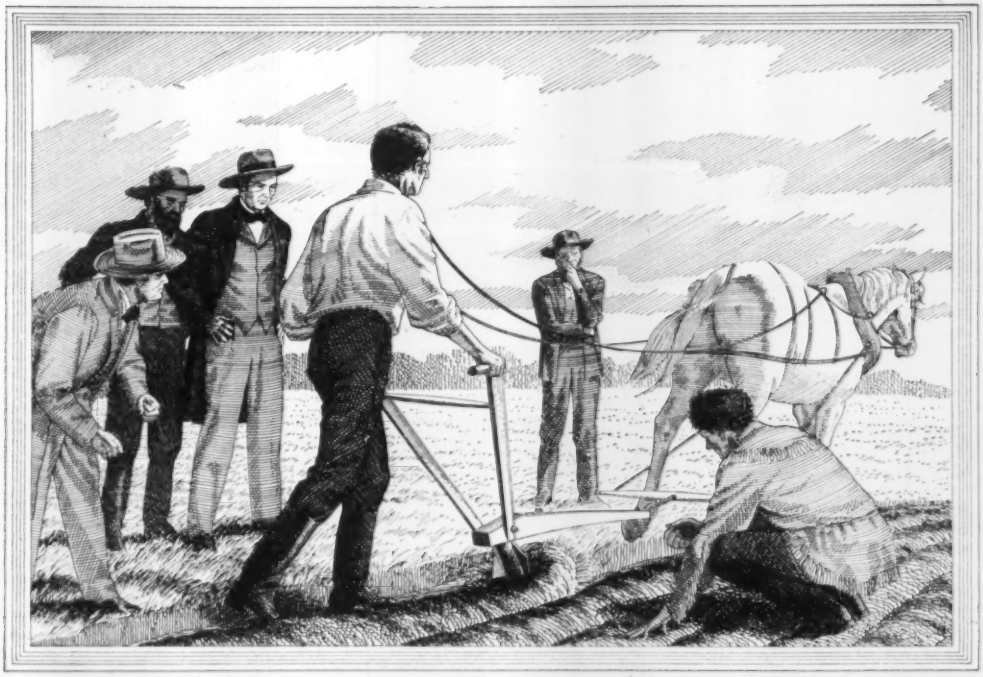
Donald F. Kane has joined the engineering staff of **Hunt-Spiller Mfg. Corp.,** Boston. He was with Factory Mutual Engineering Division Associates.

R. F. Davis, former assistant regional manager, Chicago, for **Cummins Engine Co. Inc.,** was promoted to regional manager, eastern region, with offices in New York. He succeeds **Walter N. Westland,** who now heads Cummins Diesel of New England Inc., with headquarters in Allston, Mass.

Howard Herrick, vice chairman and chief executive officer of **E. W. Bliss**

E. C. KLOTZBURGER
. . . will manage GM's plant at Arlington, Tex.

W. J. CROXSON
. . . mgr., B-O-P assembly plant, Linden, N. J.



This craftsman's plow opened up new fields

Plowshare and moldboard cut cleanly through the stubborn prairie soil of Grand Detour, Illinois, as skeptics watched, wide-eyed.

Unlike clumsy wooden or metal-shod plows, this one scoured. The year: 1837. The inventor: John Deere, blacksmith, master craftsman, fashioner of the first steel plow.

This craftsman painstakingly handmade every precious part, right down to the bolts. He knew that his plow would hold up if its fasteners held it strongly together.

Makers of modern agricultural implements are even more aware of the need for quality fasteners. They know fine fasteners are vital to today's stepped-up production . . . to speed and strengthen assembly, save scarce materials by reducing wasteful rejects. Fortunately, these contemporary craftsmen have *specialists* to aid them, like the RB&W worker in the illustration. He specializes in fasteners alone, devoting a craftsman's skill to producing bolts, nuts, screws and rivets of uniform accuracy, dependability and physical properties . . . backed up by 106 years of RB&W experience in making the finest fasteners.

We're working to make strong the things that make America strong.

We welcome your fastener problems, and have the skill to solve them. Address RB&W at Port Chester.

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

RB&W *the complete quality line*

106 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

Plants at: PORT CHESTER, N. Y., CORAOPOLIS, PA., ROCK FALLS, ILL., LOS ANGELES, CALIF. *Additional sales offices at:* PHILADELPHIA, DETROIT, CHICAGO, DALLAS, OAKLAND. *Sales agents at:* PORTLAND, SEATTLE. *Distributors from coast to coast.*

FRANK F. CAMBEST
. . . works mgr., J&L Pittsburgh Wks.

WILLIAM P. BITTENBENDER
. . . heads Inter'l Selling and Intsel Metals

JAY MISENHIMER
. . . Hyster manufacturing engineer

Co., Pittsburgh, was elected president to succeed **Louis Edgar Jr.,** resigned.

Frank F. Cambest was appointed works manager, Pittsburgh Works Division, **Jones & Laughlin Steel Corp.,** Pittsburgh. **L. A. Lambing** was named specialist-steelmaking on the staff of the vice president-operations, and **H. H. Shakely** becomes assistant works manager on the staff of Mr. Cambest. The J & L plants in Pittsburgh, Aliquippa, Pa., and Cleveland will be known as the Pittsburgh Works Division, Aliquippa Works Division and Otis Works Division. The title of general superintendent was changed to works manager.

E. W. Meyers was elected secretary, **Cullman Wheel Co.,** Chicago. He continues to head purchasing.

Maurice S. Kelly has joined **Crucible Steel Co. of America,** Pittsburgh, as editor of the company's employee newspaper scheduled to start publication early in 1952. Mr. Kelly was formerly publicity manager of National Electric Products Corp.

William P. Bittenbender was elected president of **International Selling Corp.,** New York, and its affiliate, **Intsel Metals Corp.** He was formerly vice president in charge of steel operations.

Harold E. Erf, for 12 years representative in northeastern Illinois for **Sterling Grinding Wheel Division,** Tiffin, O., Cleveland Quarries Co., was appointed sales executive-administration. **John Andreas** and **Edward Kass** were appointed sales representatives at Chicago.

C. Paul Corrigan was appointed eastern sales manager of the **Ramapo-Ajax Division** of American Brake Shoe Co., New York. Mr. Corrigan was district sales manager in Cleveland for the division.

North American Aviation Inc., Los Angeles, appointed **Louis S. Wait** general administrator of its branch at the Fresno Air Terminal, Fresno, Calif. **Thomas L. Regan** will be the Fresno superintendent; **J. D. Phillips** will be local personnel director.

Hyster Co., Portland, Oreg., appointed **Jay Misenhimer** to the newly created position of manufacturing engineer. He rejoins the company after a brief period in which he was in business for himself.

Curtis R. Henry, sales manager of **Valley Mould & Iron Corp.,** Hubbard, O., was elected vice president to succeed the late **W. B. Ogden.** Mr. Henry entered the steel industry with United Alloy Steel Corp. as a third helper and was made open-hearth superintendent in 1923. Before joining Valley Mould in 1935 he was steel works superintendent of Alan Wood Steel Co. **W. C. H. Ramage** was named assistant vice president. He joined the company in 1946.

Alan R. Burman was appointed to serve on the board of directors in addition to being a vice president of **Cro-Plate Co.,** Hartford, Conn. He assumes management of all sales activities including advertising and sales, together with development of new markets. He replaces the late **T. L. Brantly Jr.** on the board.

OBITUARIES...

Leon R. Ludwig, 47, director of engineering and research for **Westinghouse Electric Corp.'s** Atomic Power Division, and former manager of the company's Buffalo plant, died Nov. 14 at his home in Pittsburgh.

Roy M. Welch, 71, retired assistant to the president of **Youngstown Sheet & Tube Co.,** Youngstown, and a veteran of 48 years in the steel industry, died Nov. 17.

Raymond C. Force, 72, former president of **Caterpillar Tractor Co.,** Peoria, Ill., died Nov. 15 in California. He resigned the presidency in 1930 to become chairman of the executive committee. He resigned that position in 1940 when he became a director of the company.

Richard H. Lewis, 73, chairman of the executive committee of the board of directors of **Ruud Mfg. Co.,** Pittsburgh, died Nov. 13. He had been president from 1944 until September, 1951.

Edmund J. Ritchie, 62, vice president and director, **Sarco Co. Inc.,** heating equipment manufacturer, Bethlehem, Pa., died Nov. 13.

John R. McDonald, 81, Milwaukee machine tool salesman and president of **Peerless Machine Tool Co.,** Racine, Wis., died Nov. 11. He managed the Milwaukee office of E. L. Essley Machinery Co. for 43 years.

Alex R. Goldie, 78, manager of **Goldie, McCullough Co.,** office equipment manufacturer, Galt, Ont. died Nov. 10.

Ernest G. Bennett, 60, production manager, **Turnbull Elevator Co.,** Toronto, Ont., died recently.

Harry Scott, 79, for many years purchasing agent, **Sun Shipbuilding & Dry Dock Co.,** Chester, Pa., died recently.

Charles N. Stevens, 58, president-treasurer, **Milwaukee Boiler Mfg. Co.,** Milwaukee, died Nov. 9.

New tighter fit

So positive is the fit between seat and plate on this time-tested Brosius-Westling Goggle Valve, that the unit pressure is comparable to that found on flange gaskets in pressure piping. In addition to this new feature, distortion is eliminated due to heavy construction and separation between barrel and frame... moreover, manual operation is easy and fast even after long periods of idleness. Numbers of these valves are currently contracted for, yet capacity has not been reached and your inquiry is invited.

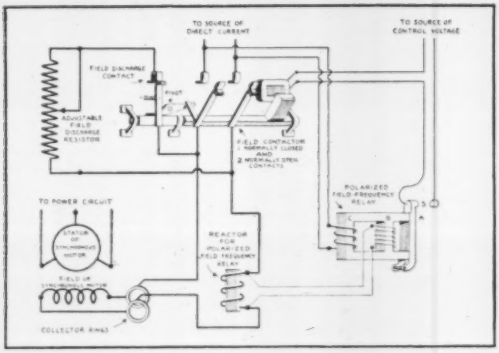
BROSIUS DIVISION

Salem-Brosius, Inc., Pittsburgh 15, Pa.

Affiliates: Salem Engineering Division, Salem, Ohio;
Salem Engineering Co., Ltd., Milford nr. Derby, England; Salem Engineering (Canada) Ltd., Toronto, Canada

EC&M SYNCHRONOUS STARTERS

with Automatic Field Application by Polarized Field-Frequency Relay


TO SOURCE OF DIRECT CURRENT
TO SOURCE OF CONTROL VOLTAGE
FIELD DISCHARGE CONTACT
ADJUSTABLE FIELD DISCHARGE RESISTOR
FIELD CONTACTOR NORMALLY CLOSED AND 2 NORMALLY OPEN CONTACTS
POLARIZED FIELD-FREQUENCY RELAY
TO POWER CIRCUIT
STATOR OF SYNCHRONOUS MOTOR
REACTOR FOR POLARIZED FIELD FREQUENCY RELAY
FIELD OF SYNCHRONOUS MOTOR
COLLECTOR RINGS

Push Button Start **brings motor up to speed automatically. Motor pulls into step *without delay*. Automatic Field Removal if motor slows down on voltage dips or overload. Field automatically re-applied when load re-accelerates.**

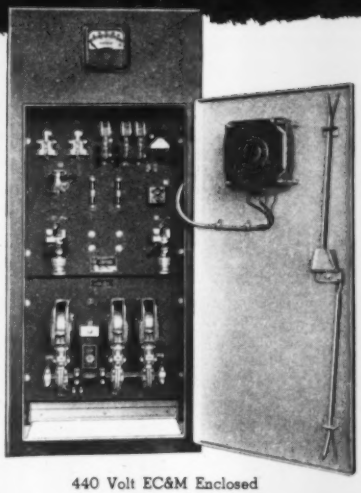
★★★

With greater skill than human hands could do it, EC&M Push Button Magnetic Starters provide completely automatic operation of synchronous motors.

At about 95% synchronous speed, the motor is pulled into synchronism. Full Field excitation occurs when the rotor and stator poles are most favorable to locking into synchronism. This causes synchronization to occur without pole slippage, with minimum line current and greatest synchronizing torque.

EC&M Synchronous Starters are built for both low and high voltages up to 4600 volts. They are of unit construction with all internal wiring complete. The cubicle types are totally enclosed and do not require an expensive control room. They may be mounted alongside the motors they control.

Write for No. 21 ACCELERATOR and Bulletins 1075, 1076, 1077 and 1078



440 Volt EC&M Enclosed Synchronous Starter

2300 Volt EC&M VALIMITOR Starter for Steel Mill Air Compressor

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Production AND Engineering NEWS AT A GLANCE

GOLD IN THAT THAR DUST—Many ferrous and nonferrous foundries are detecting the glitter of gold in materials they now blow out their smokestacks. So they're researching to find out what materials can be collected, what their market value is and how useful they might be in the foundry's operation. Tons of substances, formerly lost to the air are recovered daily. A recent baghouse collection system at a gray iron foundry operated at 98 per cent efficiency during tests. A large portion of dust and fumes collected was less than one micron in particle size. One steel company is setting up four units for large operations. Over 50 per cent of the substance recovered in secondary lead smelting collection systems is lead oxide which may be sold or recharged to furnaces. This material amounts to as much as 1000 pounds a day in large plants. A zinc smelting engineer maintains that up to 50 per cent of the material collected at his plant will eventually yield pure zinc when a treating process is completed.

CAN YOU HELP? Working on a whopping $2.5 billion chunk of business from the defense department, electronics producers are busy casting about for qualified subcontractors to make the components for radio, sonar, radar and other military equipment. There aren't enough companies with experience in machining magnesium and aluminum to the close tolerances specified. Nonferrous foundries capable of casting small and intricate shapes are also high on the wanted list. p. 82

FEWER HOLES IN HULLS—Ultrasonic testing equipment is saving many a ship hull and bulkhead from being riddled with holes to determine thickness. Thinning by corrosion has always been a bug-a-boo for ship owners. At times it has been necessary to drill up to 500 holes (enough to sink an ordinary ship) in a vessel when its age indicated a thorough examination was due. Now inspectors "listen" to the plates instead of drilling and patching test holes. In other words, don't sieve up the ship!

PRESERVES PILOTS— A 35,000-pound package of metal, wiring, electronic tubes, radar scopes and servo-mechanisms, the F86D flight simulator, is the latest earthbound device for precombat training of Air Force fighter pilots. Delivery of the all-weather trainer marks the first time a simulator has been put into training concurrently with the beginning of quantity production of a new plane, in this case the F86D Sabre. The new electro-mechanical trainer is the first to combine the simulation of two planes—the one being flown and an approaching enemy plane. It contains 1152 electronic tubes, 60 miles of wiring, takes up 600 feet of floor space and stands 10 feet high. Over 100,000 engineering hours went into its design.

ANTICIPATE FINISH FAILURE—Plenty of emphasis is being placed on specification finishes and the importance of choosing the right organic finish for the right product. Under a present-day testing theory, the idea is to recognize signs of deterioration early and to correlate these with type of finish, base metal characteristics, environment, type of service. Testing to failure is out. In certain types of military production, gloss measurements, adherence, hardness, salt spray tests are important. p. 86

ROLL IN THE BARREL—NPA reminds us that lubricating practices should be re-examined in shops where higher speeds and feeds are being used to produce defense materiel. Any equipment operated under heavier loads or around the clock is subject to accelerated wear and deterioration. Good lubrication practice includes: (1) Selection of a lubricant having the best oiling characteristics for the equipment it's used on; (2) application of the lubricant on a recommended and well-established schedule; (3) careful cleaning of lubricating mechanisms and (4) careful storage of lubricants. Squeak!

WHAT MANGANESE SHORTAGE?—Simple, practical, economical solution to the manganese shortage problem is provided by the Sylvester process, which recovers manganese and iron from open-hearth slag. Based on proved pyrochemical and mineral dressing operations, the method recovers in concentrate form 75 to 85 per cent of the manganese and iron contained in the original slag. Metallic content of the concentrate is about 50 per cent. Cost of producing concentrate: About $5 per ton of slag processed or $10 per ton of concentrate regardless of manganese content. The only raw materials needed are slag, limestone or silica sand, small amounts of fluorspar and waste coke. p. 84

COUGH UP THE CARBOYS—Critical is the word for the carboy situation. Glass carboys aren't available in sufficient numbers to meet the increased demands for them, so if you have any empties on hand, return them to your supplier. You'll be doing him and yourself a favor. Carboys are the containers acidic materials are shipped in.

EXPANDED ELECTRONICS

Brings Surge in Subcontracting Opportunities

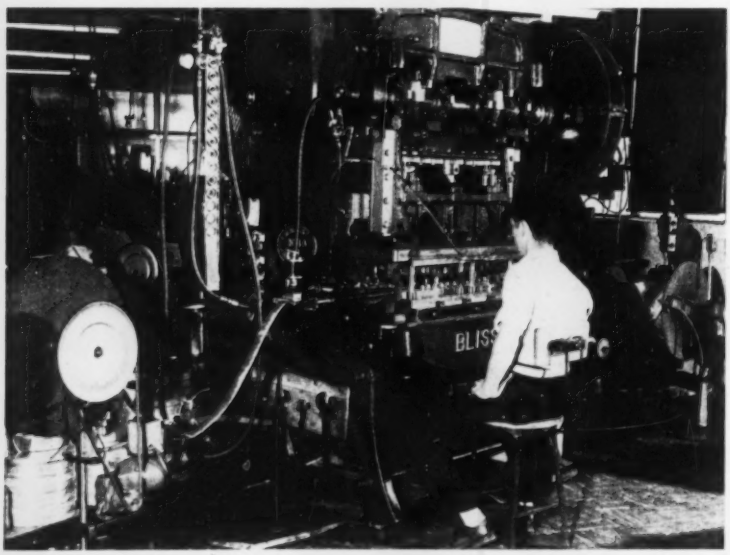
Metalworking will find a substantial volume of work next year in military and industrial electronic programs. Companies capable of performing operations to close tolerances are already being sought by prime contractors

ASSEMBLING tiny stampings for a part used in a cathode ray tube electron gun is only one of many precision operations required in the military electronics program. Little parts will take a lot of metalworking's talent in 1952

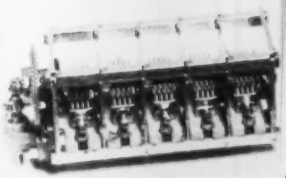
OPPORTUNITIES exist in electronics for many companies to take up the slack of shrinking civilian production. Almost $5 billion out of the recent military appropriation of $59 billion is set up for the various electronic programs. Included in this figure are a number of items that are electronic only by military definition but equipment like radio, radar, sonar, computors, etc. manufactured by companies considered electronic producers totals a hefty $2.5 billion. It is equal to the dollar value of shipments by the machine tool industry in 1942 and 1943, combined, the two biggest years in that industry's history.

Not all the opportunity in electronics is confined to military work. Defense-support programs like civil defense, communications, transportation and plant expansions will account for millions more in the next few years. The radio and television industries too are very much alive. In television the Federal Communications Commission is expected to lift its freeze on new stations in the first half of 1952 and grant about 80 construction permits for UHF and VHF stations by July 1, 1952. E. T. Morris Jr., director of the Electronics Division, NPA, estimates that equipment materials requirements for these stations in each of the last two quarters next year will take 2000 tons of structural steel, 3400 tons of other steel, 400,000 pounds of copper and 85,000 pounds of aluminum. He further estimates that between 3.5 and 4 million television sets will be built next year, compared with 5 million sets estimated for 1951.

To help prime contractors and subcontractors get together, Radio-Television Manufacturers Association, 1317 F St. N. W., Washington, formed a small business committee. The group compiles information on



Completely mechanized unit consisting of an automatic feed, double crank press, progressive die and scrap wheel combine to produce 55 shield bases a minute at Volkert's Long Island plant. Made of 0.014-inch brass the stamping is trimmed, drawn, blanked, straightened, pierced, necked, formed and dimpled in a 16-station die



Ganged tuning condenser from current version of the walkie-talkie at left illustrates the trend toward miniaturization of electronic equipment. Corresponding part from World War II model made by RCA is at the right

PROGRAM

By ED KARPICK
Associate Editor

companies interested in getting into the electronics program as subcontractors and assists them in getting together with prime contractors desiring their services.

Furnish the Facts—Information submitted to the committee should be to the point. List equipment contained in your plant and specific types of work your company has done either for military or civilian production. Avoid general statements like, "We can do anything." RTMA experience with companies making such claims has been unsatisfactory and the association has neither the time nor manpower to check individual companies.

If you have a brochure prepared that tells your story, send it along but it isn't necessary to go to the expense of preparing one if you can tell your story factually in typewritten form. Remember that you will have to be able to work to military specifications and if you doubt that your machinery or personnel will fill the bill look for work in other areas.

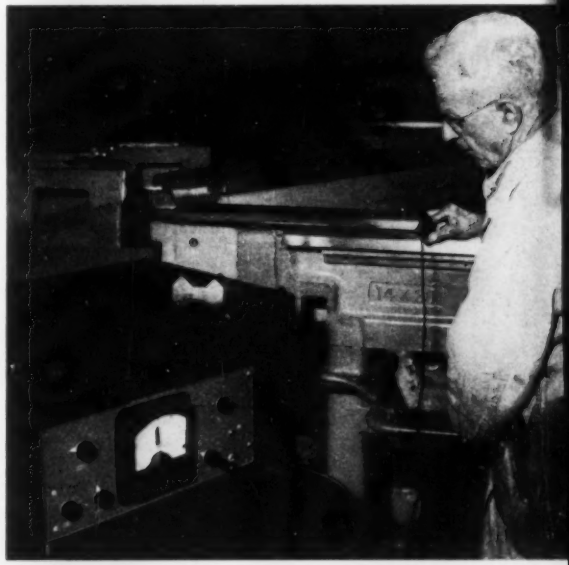
No Cure All—Obviously electronics is not a haven for every metalworking company seeking to boost its production. Nor do all the prime contractors require the same products and services. Companies like General Electric and Westinghouse have the machinery and know how to perform certain metalworking operations that can't be handled by smaller firms or some of the larger companies that don't produce the broad range of products requiring all the machinery necessary for turning out military equipment.

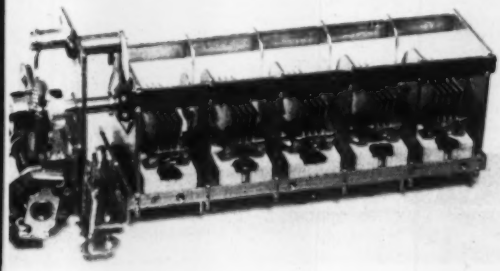
"As an industry we're fundamentally assemblers," explains a Western Electric executive, "and have always relied on a flow of parts from suppliers to keep our lines moving." RCA with most of $586 million in sales last year coming from electronics reports about 60 per cent of the cost of its products is subcontracted.

Enlightening Data—When RCA found no one including the government (*Please turn to Page* 96)

Radio junction box for a Lockheed Super Constellation is now fabricated outside the aircraft in a fraction of the time previously taken to string the assembly in cramped quarters inside the aircraft itself

One of the many ways in which industry uses electronics is shown at Hendy Machine Co., Torrington, Conn., where a GE metals comparator is used to test hardness of a lathe bed way by checking it against a standard sample calibrated at 70 scleroscope





Sylvester Process

. . . Extracts Manganese from Slag

Pilot plant operation of this new extraction method revealed that the process involved will work successfully and at high efficiency. Operating engineers have no doubt that production costs will be low as the different processes utilized are presently operating on a large scale in the Portland cement and taconite concentrating fields

By GEORGE R. SYLVESTER
President
Sylvester & Co.
Cleveland

OVER 90 per cent of our manganese comes from imported ores, and, prior to 1949, roughly one third of our imports were from Russia. Since that time, Russia has choked off our supplies, and we have had to develop other sources in India, Africa, and South America. Receipts of ore are not, however, keeping pace with requirements, as industry stocks are being depleted to meet current demands. Uncertainty of overseas transportation, together with dwindling high grade supplies, are causing increasing alarm in industrial circles. Of all stockpiled strategic materials, manganese ores are acknowledged to be the most critical. Our national security demands the discovery of other sources.

The Sylvester & Co. process for the recovery of manganese and iron from open-hearth slag and low grade ores provides a simple, practical, and economical solution to the entire manganese problem. It is based on rather simple mineralogical phenomena and does not use critical or costly equipment or require strategic raw materials. Six or seven plants will not cost as much as a single blast furnace—utilized by other extraction processes—nor use as much strategic material, yet they will produce more manganese at a higher yield at a much lower cost. Manganese can be produced in almost any form, either as an oxide concentrate, spiegeleisen or as ferromanganese.

Process Utilizes Simple Methods — Methods used in the process are simple pyrochemical and mineral dressing operations, all of which have been well proved by commercial use on a large scale in other industries. Basic principles of the process were derived from many years' work on similar mineralogical problems. Extensive small scale laboratory work proved the feasibility of the various steps required to recover manganese from slag. Later, larger scale trials fully confirmed the previous results. Finally, demonstrations were undertaken in pilot size equipment, where the results even exceeded those of the smaller operations. In general, the process consists of crushing and grinding operations, rotary kiln sintering with the addition of limestone below the fusion point of the slag, fine wet grinding, and subsequent magnetic separation. Separation may be supplemented by other cleaning methods, dependent upon the type of end product to be made. The concentrate resulting from the separation step is then melted to form any manganese alloy desired.

The rejected portion of the slag, called tailings, will consist of a fine, chemically active mixture of lime silicates, phosphorus, and trace elements. Because of the fine size and solubility, this product will find considerable use as an agricultural fertilizer addition.

No Critical Materials Needed—Only raw materials needed are slag, limestone or silica sand, small amounts of fluorspar, and waste coke in fine sizes. Any type of fuel can be used, and consumption of electric power is not excessive. Utilization of modern processing equipment eliminates the need of a large labor force, so that use of critical manpower is not a factor.

A Three-Step Process — The process consists of three essential steps. First, a slag is corrected to a molecular lime: Silica ratio of about 2, as determined by the following formula:

$$2 \text{ equals } \frac{(CaO - 3P_2O_5)}{SiO_2}$$

This is accomplished by the addition of limestone or silica, as required. The mixture is then fired until the oxides of iron, manganese, aluminum, and magnesium separate into one crystalline phase and the oxides of silicon, calcium and phosphorus separate into another crystalline phase. Second, the oxide phase is separated from the silicate and phosphate phase. Third, the oxide phase is either reduced directly to spiegeleisen or, by a two-stage reduction, to iron and ferromanganese.

Advantages Outlined—Recovery in the concentrate form of 75 to 85 per cent of the manganese and iron contained in the original slag; processing of either flush slag or common mixtures of flush and tap slag; reduction of phosphorus content of the concentrate to below 0.01 per cent if desired, are process features. Phosphorus can be reduced to practically zero with simple extra processing equipment. Metallic content of the concentrate will approximate 50 per cent. If

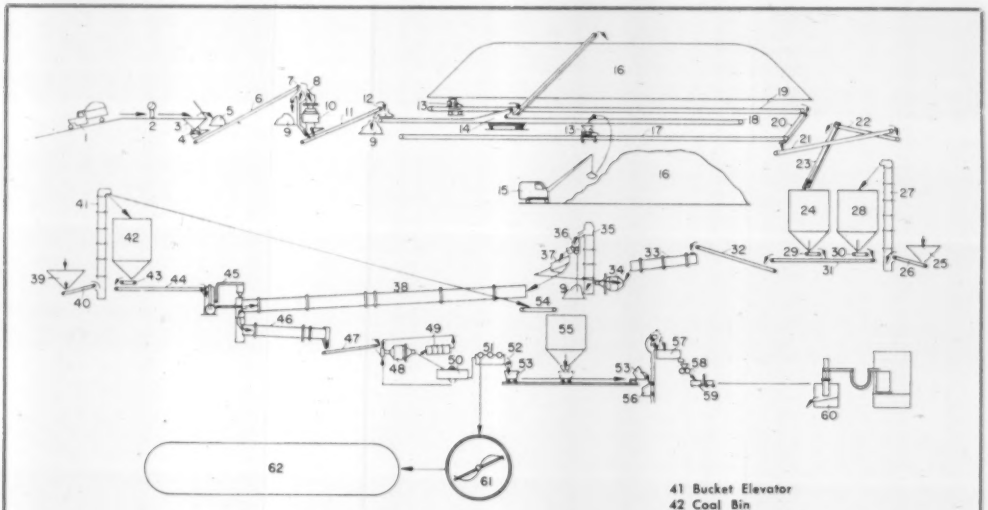
slags low in magnesia are used, metallic content will be even higher. Ratios of iron to manganese will be determined by the ratio of the original slag. Cost of producing the concentrate will approximate $5.00 per ton of slag processed or $10.00 per ton of concentrate regardless of the manganese content.

Uses for Magnetic Concentrate — The magnetic concentrate can be used in many different ways. In the briquetted form it can be fed to blast furnaces to produce a higher manganese content in the hot metal. The briquetted concentrate can be added directly to the open hearth although manganese efficiency will be low. By use of the process, a high circulating load of manganese will not be costly to process. The residual manganese in the open-hearth product can help reduce the required additions.

The concentrate can be smelted by any suitable type of furnace directly to spiegeleisen. Ratio of iron to manganese in the spiegel will be the same as that in the original slag. Usually this will produce a spiegel containing roughly 30 per cent manganese. It can be used as an auxiliary feed by present ferromanganese producing furnaces. It can also be reduced by two steps to low phosphorus pig iron and standard ferromanganese. The pig iron may be sold in the open market or may be used as an addition to the hot metal. The manganese slag may be used to make any grade of ferromanganese or it may be mixed with low-grade ore to produce ferromanganese. And finally the concentrate may be chemically treated or leached if such treatment is economically practical to produce iron and manganese products.

Many important advantages will accrue from the building of these manganese recovery plants. Strategic stockpiling of manganese ores can be completely eliminated, releasing millions of dollars and many ships for vital materials which will never be available in the United States. Transportation within the country will be unburdened to the extent that slag would be treated at the steel mills, where it is formed and where the manganese product is used. Valuable pig iron is automatically recovered at the same time, indirectly contributing to our supply of iron ore. Last but not least, unsightly slag dumps on valuable industrial land could be eliminated.

Flow sheet of the manganese recovery plant which utilizes the new Sylvester process



LEGEND

1 Dump Truck
2 Platform Scale
3 Truck Hopper & Grating
4 Pan Feeder
5 +6" Reject Pile
6 Belt Conveyor
7 Magnetic Pulley
8 Bar Screen
9 Tramp Metal
10 Cone Crusher
11 Belt Conveyor
12 Magnetic Pulley
13 Traveling Hopper & Feeder
14 Traveling Stacker & Conveyor
15 Clamshell Excavator
16 Slag Storage
17-23 Belt Conveyor
24 Slag Bin
25 Track Hopper
26 Belt Feeder
27 Bucket Elevator
28 Stone or Sand Bin
29-30 Constant Weight Feeder
31-32 Belt Conveyor
33 Drier
34 Ball Mill—Dry
35 Bucket Elevator
36 Magnetic Separator
37 Vibrating Screen
38 Rotary Kiln
39 Track Hopper
40 Belt Feeder
41 Bucket Elevator
42 Coal Bin
43-44 Belt Conveyor
45 Coal Pulverizer & Burner
46 Rotary Cooler
47 Drag Chain Conveyor
48 Ball Mill—Wet
49 Counter Current Classifier
50 Hydro-Classifier
51 Magnetic Separator
52 Screw Feeder
53 Batch Car
54 Belt Conveyor
55 Coke Bin
56 Skip Hoist
57 Mixer
58 Briquette Machine
59 Lift Truck
60 Electric Arc Furnace
61 Thickener
62 Tailing Storage

TESTING ORGANIC

Current thinking on the selection of organic finishes is not actually to test to failure, but to recognize signs of deterioration early and to correlate these with type of finish, environment, service, base metal characteristics etc. This article interprets tests and finish requirements in terms of finish selection, surface preparation, application methods

MANY factors influence the durability of organic coatings. Because good coatings require a relatively long time to deteriorate, methods for evaluating their durability have been an active subject among metal finishing technologists for a number of years.

Irrespective of physical testing methods, two general schemes for evaluating the relative durability have been developed. One consists of exposure tests, at selected test sites. The other involves accelerated test cycles conducted in appropriate test devices.

Record Evidence—In either application of exposure testing procedures, the results obtained depend primarily on the careful recording of visual evidence of degradation. Another scheme which is finding more and more favor consists of evaluating the physical changes taking place in the course of exposure, and attempting to relate these changes to exposure life. In this method it is not necessary to await the visual appearance of decay of coatings, inasmuch as past experience and the symptoms leading to such evidences can be recognized at an early date.

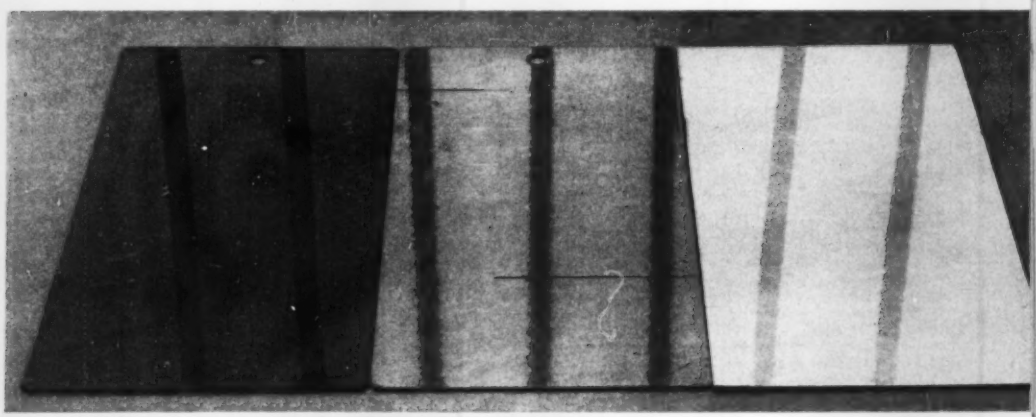
Chief limitations of normal outdoor exposure tests are length of time required to obtain results and variation between climatic conditions at the various exposure locations. Metal finishing engineers for some years have utilized accelerated exposure tests in which the various outdoor exposure factors may be simulated and intensified. Salt fog chambers, humidity cabinets, and the so-called "weathering machines" are well known examples of the accelerated type of tests.

In many cases, such tests must be made on a comparative basis since the testing conditions may not be reproducible or the results may not lend themselves to numerical evaluation. Corrosion tests of this type may consist in the exposure of suitable specimens to various environments and determining the point at which attack upon the base metal begins or reaches an allowable level. Frequently, the thickness and/or combination of coatings is varied as a means of determining rates of deterioration.

Salt Spray Test—The salt spray test consists of atomizing approximately a 20 per cent salt solution, allowing the salt fog to pass over the test samples. The method is described in ASTM specification B-117-44 T. Commercial cabinets for salt fog testing are available. The salt spray test is also valuable for comparing the efficiency of phosphate and other coatings under organic finishes.

Work conducted by Van M. Darsey and Walter R. Cavanagh, Parker Rust Proof Co. shows that in maintaining the temperature of the salt spray test cabinet, it is important to prevent overheating the cabinet at any one location, otherwise moisture will be eva-

These metal panels illustrate the different gloss, painted in colors indicated. Courtesy Shell Development Co.

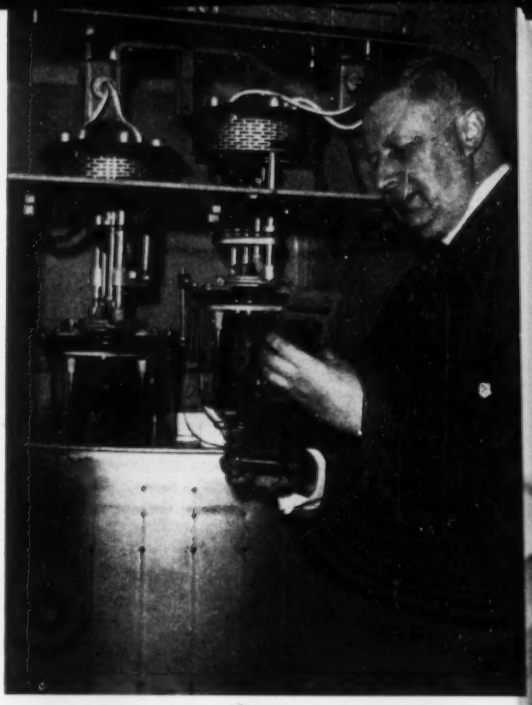


porated from the salt fog particles and the salt deposited in such areas. Maintenance of a uniform temperature in the salt spray cabinet is more difficult than generally believed. A temperature of 95° ±2° F was suggested, since it was believed easier to maintain this temperature which is about the maximum experienced in summer, than to provide cooling facilities to maintain the spray cabinet at the temperature usually experienced from operation at room temperature during winter months.

Maintain Position—Other points important to salt spray testing were also brought out by this study. It is essential to expose specimens to the salt fog in similar positions if results are to be comparable. Use of a salt fog containing more than 22 per cent salt results in less paint creepage than when a fog containing 18 to 22 per cent salt is used. Tests have shown that the pH of a salt solution saturated with air rises as the temperature increases due to the lowering of the solubility of carbon dioxide in the solution.

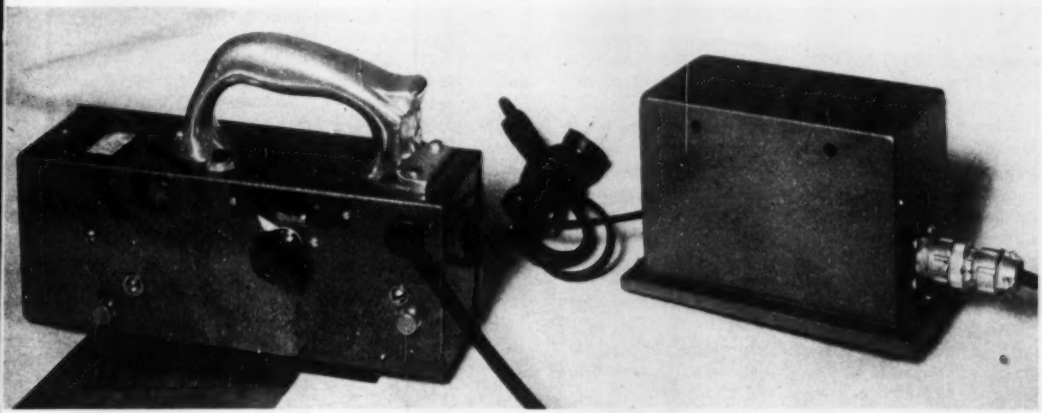
To maintain constant conditions in a salt fog cabinet at 95° F, the pH should be adjusted to produce a fog which has a pH between 6.5 and 7.2, while it is maintained at 95° F, or by adjusting the pH at room temperature until a sample has a pH of 6.5 to 7.2 after being gently boiled for 30 seconds. In salt fog chambers where the salt solution is contained within the fog chamber at 95° F, no difficulty should be encountered if the solution is allowed to reach equilibrium before adjusting the pH. Monel metal is generally considered to be a satisfactory container for neutral salt solution that has been properly adjusted.

Certain critical pressures exist at which abnormal increases in the corrosiveness of the salt fog have been noted, when the air pressure fluctuates. These critical pressures appear to be related to the size of the fluid orifice and independent of the size of the air orifice. Such increases in the corrosiveness of the fog can be avoided by controlling the pressure to avoid fluctuations greater than ±0.1 psi, or by using pressures above or below the critical pressure



Prof. Max Kronstein examines the coated panels being removed from the Atlas twin arc Weather-Ometer to determine effect of this test in laboratory of New York University

Sixty-degree glossmeter used for making gloss and reflectance measurements. Courtesy Henry A. Gardner Laboratories

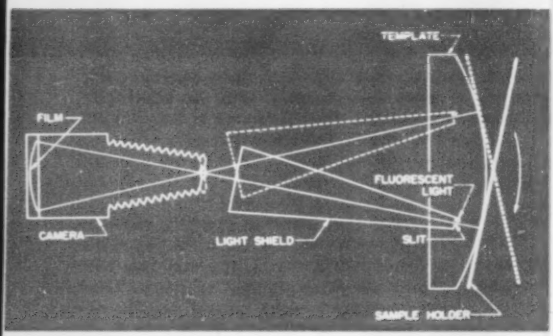


provided the critical pressure of the nozzle being used is known.

Panels Checked Daily—In testing organic finishes to be used on appliances at the Bridgeport Works Laboratory of General Electric Co., an "X" is scratched in the center of the finished panel cutting through the coating and exposing the bare metal, prior to the time the panel is hung in the salt spray cabinet. Panels are left in the test for 200 hours and examined daily during this period for signs of deterioration. At the end of this 200-hour period, the panels are removed, washed, dried, and rated.

Rating is made on the basis of ten being perfect. Failure in salt spray usually shows up in the form of corrosion creepage back from the scratch in the panel, and from the edges of the panel. Grading is done by subtracting one point from the ten for each 1/16-inch creepage. Usually not more than 1/16-inch creepage is allowed.

Moisture Resistance Tests — Exposure to 100 per cent relative humidity in the vicinity of 100°F or immersion in water at 100°F is used for determining the moisture resistance of organic finishes. The humidity test is conducted in a room or chamber in



Schematic drawing of the machine in Shell Development Laboratories for photographing surface details of glossy panels

which the relative humidity is maintained at 100 per cent through the use of live steam or an immersion heater in a tank of water. Temperature should be maintained at 90 to 100°F and air circulation provided to maintain uniform conditions throughout the chamber.

Some tests are so arranged that the test panels are mounted on platens or pipes through which water is flowed so that they are cooled just enough to cause constant sweating. The water immersion test is made by immersing the test panels in a water bath maintained at 95-105°F. The water should be changed periodically. Generally, it is considered that the two tests give comparable results for film blistering, but the humidity test gives better results for underfilm corrosion.

In carrying out the test, the panels should be examined at the end of 24, 48, 96, 250, 500 and 1000 hours for blister formation, underfilm corrosion, adherence, softening and checking, or cracking of the finish. A finish that stands up for 1000 hours is reported to be satisfactory from the standpoint of moisture resistance for use on refrigerators. Moisture resistance of requirements of finishes for other appliances are somewhat lower than for refrigerators. Humidity and water immersion tests are also very valuable for checking parts for contamination on surfaces before finishing such as finger prints and other soluble contamination which will cause blister formation.

Weather-Ometer Test—Test devices have been developed in which a series of panels can be exposed to a number of different exposure conditions. The Weather-Ometer is a self-contained machine, embodying three weathering agents; namely, synthetic June sunlight, mild or vigorous rain (water spray) and temperature changes.

This accelerated weathering machine operates on the following principle: If a light source, whose total radiation approximates noon June sunlight, is played on the surface of a material, under controlled temperature conditions and if followed by a water spray of known temperature, pressure and volume, the material thus exposed will take on surface and color characteristics similar to those produced by outdoor exposure, but in much less time.

Gloss Measured—One of the most important appearance characteristics of finishes is gloss. In terms of finish evaluation, gloss is usually thought to mean luster, shininess, or ability of a coated surface to reflect light specularly. Gloss is closely tied in with surface appearance, since some of the characteristics of appearance are appreciated as gloss and some are appreciated as surface texture.

Recent developments have been made in instruments for making reflectance and gloss measurements of coated surfaces. In research work these new instruments are being used for quantitative studies of appearance changes such as loss of gloss and change of reflectance, which accompanies weathering, wear from abrasion, fading from sunlight, etc. In many cases it has been found worthwhile to place gloss measuring instruments in the factory, as well as the laboratory, to make on-the-spot measurements of many industrial finishes.

Clear Mirror Images — High-gloss surfaces are characterized by clear mirror images. The Hunter gloss comparator is an instrument used to test the surface for its capacity to form clear mirror images. The Detroit Paint and Varnish Production Club describes a method for making gloss measurements under uniform conditions and in comparison with a set of standards. The device used consists of a shallow tray with a hinged cover and a set of ten standard panels. Cover of the box has a glass window, the surface of which is either ground or sprayed with a flat lacquer.

Black bars on the cover are ¼-inch wide and 2¼ inches apart. The tray interior is lined with black velvet. Standards are obtained by adding a flattening paste to a glossy lacquer. To obtain equal gradations of gloss, it is necessary to add the flattening paste in geometrical ratios. To use these

standards they are merely arranged in order in the front of the tray. The sample is then placed in the back, and the intensity of the reflected image (black bars) is compared with the standard.

60-Degree Glossmeter—Instruments have been designed which can be used to measure the amount of light reflected from a glossy coated surface, usually in the mirror direction, under certain specified conditions of illumination. One instrument of this type is the 60-degree glossmeter. The amount of light striking the surface at 60 degrees from the vertical is reflected at 60 degrees in the opposite direction. The 60-degree angle and other characteristics of such glossmeters conform closely to the requirements of procedure C of ASTM tentative method D523-44T for the specular gloss of paint finishes.

Geometric conditions of this test were originally selected as those giving the best correlation between the instrument settings and visual judgment of the gloss of paints. The instrument's compactness, and rapidity with which measurements can be made adapt it to production line control methods.

The 60-degree glossmeter measures specular gloss, which is indicative of shininess rather than sharpness-of-reflected image gloss. It is claimed that changes of a few per cent in specular gloss, due to weathering, abrasion, chemical attack and similar causes can be detected and measured with this instrument even in cases where the effects cannot be observed visually.

Readings Taken Rapidly—When using either the reflectometer or glossmeter, a standard is first placed under the instrument and the meter adjusted to the standard. The instrument is then placed on the test surface, and the reading made. During any long series of observations, it is advisable to check the instrument with a standard at regular intervals to guard against drift. Instrument readings are most accurate when they are taken rapidly at regular intervals so that effects of photocell and battery fatigue remain constant.

When a series of standards is available, it is recommended that the standard closest in value to the specimens being measured be used for final adjustment of the instrument. The portable glossmeter may be used to check aircraft finishes for compliance with gloss and reflectance measurements after application; to check the finish on office furniture for glare.

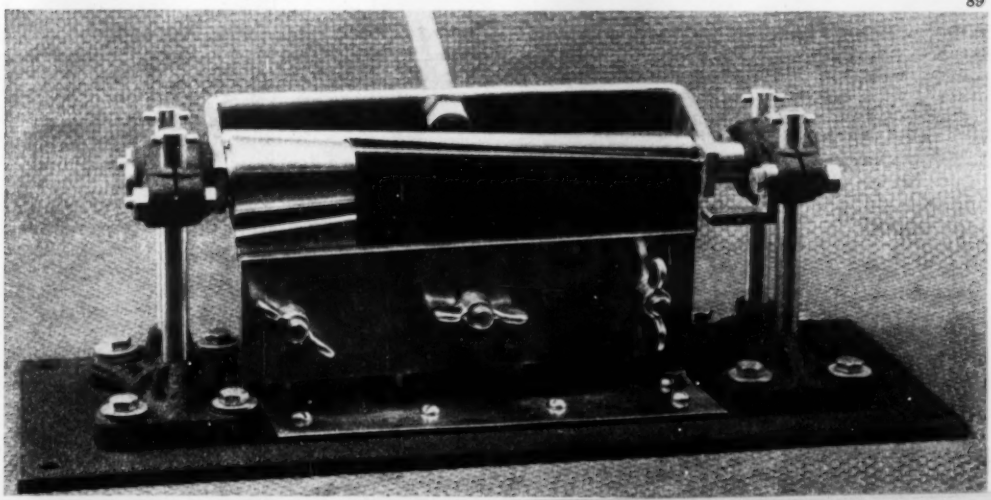
In discussing the technique for photographing the surface details of glossy panels before a symposium on paint and varnish chemistry, Luck and Archibald pointed out that the reason surface details may not be photographed in a conventional manner is because a glossy surface will reflect light specularly, regardless of intensity of illumination used. When examining the surface at the specular angle, the specular reflection prevents an adequate view of the surface detail. Surface of a glossy panel may be thought of as composed of innumerable reflecting surfaces, though not so many reflecting surfaces, nor so small as to result in a matte surface.

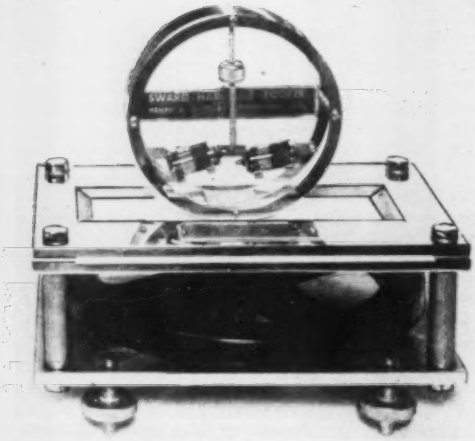
Color Retention Tests—Color retention tests should give an indication of the ability of an organic finish to retain its original color and gloss over a long period of time. Color retention of white finishes may be affected by many exposure conditions. No one test reveals complete information. The initial color change in an organic finish, commonly called bleach after baking, can be checked by masking a portion of the panel and exposing for 2 hours to bright sunlight. After exposure, the finish should be placed in a dark room free to air circulation for 24 hours and examined for the degree it has returned to the original color.

Bleaching affects the color matching of metal parts in assembly, and may show up adversely as a contrast between protected and unprotected areas in display cases. A comparison of the color retention under clean exposure conditions can be made by exposure under glass to sunlight for a period of two weeks, one month, and two months.

Sometimes the ultraviolet rays produced by the Weather-Ometer machine are used to test color re-

Conical mandrel tester for determining the distensibility of organic coatings. Finish specimen is securely clamped vertically between cone and drawbar. Operating lever is then moved to wrap panel uniformly around conical mandrel. Courtesy Gardner Laboratories





Sward hardness rocker with panel holder, for testing hardness of organic finishes

tention, wherein a portion of the test piece is shielded from the rays with a material such as aluminum foil, so that the original and final colors may be compared at the end of the test on each piece. Other tests such as alkali resistance tests, stain, and grease resistance tests may be required for organic coatings applied to certain products, particularly to those which will find their final application on some household appliances.

Distensibility Properties—One of the most important properties of an organic finish is its distensibility. The importance of distensibility measurements lies in the fact that they furnish a sensitive criterion for aging of coatings. In general, those organic coatings which reach a low distensibility most rapidly also fail the earliest on exposure.

Distensibility of attached coatings is determined either by direct extension of a suitable test specimen and observing the per cent elongation at which rupture in the form of microscopic cracks occurs, or by bending over mandrels of known radius and calculating the per cent elongation at first rupture.

Hardness and Drying Time—Hardness is generally thought to be related to drying time. A film may be considered dry when it has reached a certain degree of hardness. However, the hardening action may continue for a long time. Two main types of hardness are recognized, resistance to scratching and resistance to indentation. Various methods of determining hardness have been developed. Some of these are based on indentation such as the Pfund and Knoop indentor methods, the swinging beam or Sward rocker tests or microscratch tests.

The Sward hardness rocker test device consists of two 4-inch metal rings spaced 1 inch apart with a bubble level at the bottom and two tube type levels set at different angles in the lower half for indicating the beginning and end of the test. Operation of this instrument is based on the principle that the harder the finish the longer the instrument will rock, once set in motion.

Applying this instrument to finishes used on appliances here is one procedure: A finished panel which has been aged for 48 hours is placed in a level position and the rocker set in motion on its surface. Counting the oscillations begins from the time the bubble in the left hand tube level fails to move by a mark in the tube, and continues until the bubble in the right hand level fails to move by its mark. The rocker is adjusted to give 50 oscillations on polished plate glass. Multiplying by two gives 100, the value of the plate glass as a reference standard.

Adhesion Important — Any organic coating must adhere well for relatively long periods of time. While it is important to obtain a high order of initial adherence when considered from the standpoint of durability, the retention of adherence is really more important. As a rule, evidence of poor adherence, such as flaking, peeling and easy removal by some external force may be so obvious as to suggest a simple cause for the loss of adherence. However, these ultimate signs of loss of adherence may be the result of a number of factors.

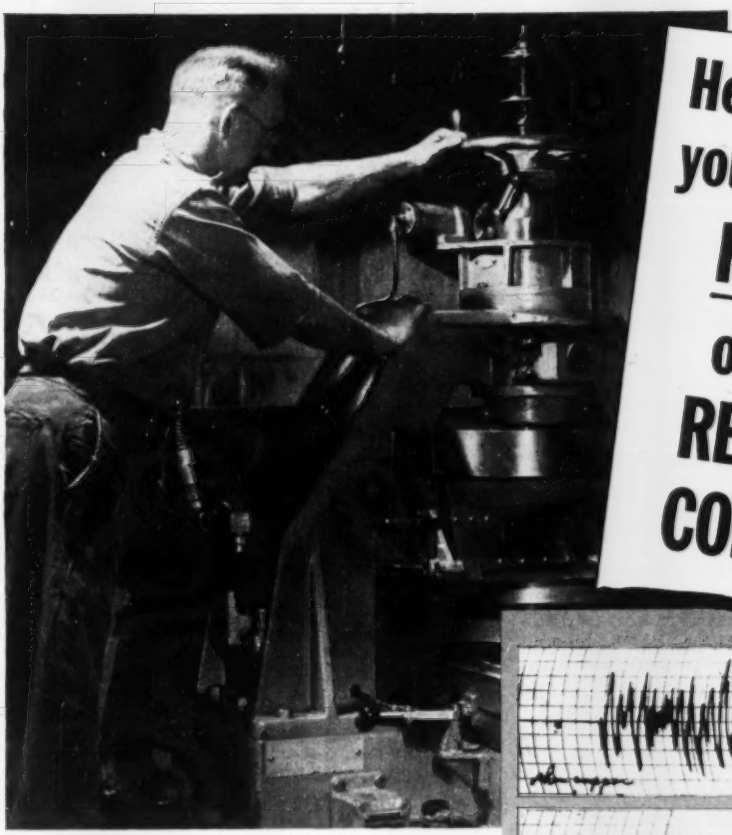
In the actual measurement of the adherence of an organic coating to the base metal, the results may be modified and influenced by such other characteristics of the film as its cohesion, plasticity, and brittleness. Tensile methods, scratching or gouging tests, base deformation tests, and impact tests have all been applied to adherence measurements.

Impact tests, though usually of a somewhat arbitrary nature, tend to show the degree to which a coating adheres to its substrate. The effect of various surface preparations on initial adherence is clearly reflected, and changes in adherence brought about by interfacial reactions at the metal substrate are generally revealed. Tests for the determination of resistance of coatings to impact are frequently based on falling balls or hammers.

Estimates Adhesional Level—The Erickson tester has been advocated for use as a test instrument for estimation of the adhesional level of an organic coating based on its behavior during deformation of the base. In the operation of this instrument, a hemispherical plunger is slowly forced down on the back of the test panel, which is supported on a firm base having a round opening beneath the plunger. This procedure is continued until rupture of the film takes place.

Impact resistance may be affected by the toughness or brittleness of the film, as well as by its adherence to the base metal. Thus the character of the failure of an impact test must be recorded in relation to other qualities.

Efforts of the New York Paint and Varnish Production Club to establish a satisfactory adhesion tester led to the recommendation of a technique based on a tensile pull method. According to this method, the adhesional level is expressed as the force applied parallel to the plane of the film, which is required to strip the coating from the base. The painted panel is secured in one jaw of a tensile test machine, and a wooden block, secured under pressure to the paint



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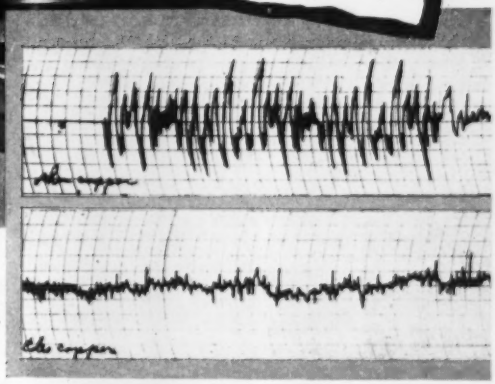

Diamond surfacing machine in the Edes plant, producing a perfect surface on a Revere Copper Sheet.

Charts showing typical surfaces. Top, ordinary copper plate. Bottom, a diamond-finished Edes plate. It takes fine copper to produce this result.

• One of the country's best-known suppliers of copper plates for photoengraving is The Edes Manufacturing Company, Plymouth, Mass. Edes has developed a patented process that is unique for giving plates the final polish. They are surfaced with diamond cutters, specially cut and ground. The plates thus produced and shipped to photo-engravers have an accuracy of plus or minus .00025 inch, practically dead flat and true to gauge at any point within these limits. Obviously, only exceptional copper will do.

Making copper sheets for this service is an exacting process. The metal as supplied by Revere must be specially handled in the mill to make sure there are neither surface nor imbedded imperfections, since a pin-point defect in the finished plate will show in printing.

Revere has always taken a deep interest in the graphic arts, not only because the industry is a good market for copper, but also because Paul Revere himself was a skilled engraver on copper. Thus it is likely that the original plates for this advertisement were of Revere Copper, and also many of the plates used by the magazines you read. In addition, Revere supplies copper rolls for rotogravure, the comics, and for textile printing. For fine copper for graphic processes, consult Revere.

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surface with a thermoplastic cement so as to cover a standard area of film, is held in the other jaw. One modification of the technique uses small areas of contact and permits bonding of the two previously painted sections of the tensile specimen by the application of the same material that is being tested.

Knife Scratch Effective—Some idea of adhesion may be gotten by simply scratching the film with a sharp knife. One rough quantitative method consists of making a series of cuts in the film down to the base by running a sharp knife over the surface along a straight edge. The cuts are made parallel and the distance between cuts may vary, but is generally about 1/16-inch. Following this, another series of cuts is made over the first at right angles. The total number of squares is counted and also the number of damaged or undamaged squares.

Where the adhesion is very poor, practically no squares will be left intact; whereas, if the adhesion is good most of the squares will be left intact. Also, in such a testing procedure the spacing between lines to produce displacement of the film will be decreased as the adhesional value increases.

Sometimes tests for adherence employ a scratching method, which is applied to the coating in such a way that under a given condition of loading, the finish is just barely removed from the surface. The load, on a scratching or scraping member, at which the coating begins to be removed from the surface of the base metal, is given as the scratch adhesion. In some cases, the figure for scratch-adhesion resistance is given as the maximum load that the film can withstand without being removed from metal.

Measures Stripping Force—Recently, a new method of adherence measurement based on a modified scratch test has been developed in the research laboratories of Interchemical Corp. The instrument, known as the adherometer, is designed to measure the stripping force, in dynes, required to remove a paint film from the surface of a metal test panel. The test panel, 6 inches long, is caused to move slowly under a hard ivory cutting tool 4 mm wide, which has been beveled to a thin straight edge. The ivory tool is held by a lever arm which is weighted to hold the cutting edge firmly against the metal surface of the panel.

This lever arm, mounted on a practically frictionless roller bearing, is connected to a weighted pendulum causing it to swing outward to an extent proportional to the force being utilized in stripping the 4 mm band of paint film. The amount of pendulum swing is read on an Ames gage operating through an accurately machined cam attached to the pendulum at its axis. One scale division corresponds to a ¼-degree swing. Conversion tables provide quick means of translating the scale reading into dynes.

Two Basic Components—It has been little realized that stripping force whether tested with the thumb nail or pen-knife, or accurately measured with the adherometer, is actually a composite of the adhesion at the film-metal interface and the toughness or resistance of the film to deformation. The latter force is proportional to the thickness of the film, while the former is solely an interfacial attraction dependent on the formulation of the paint and the kind of metal surface used.

By using the adherometer to measure a series of panels coated with varying film thicknesses, the stripping force can be resolved by simple calculation into the two basic components. This provides an important new tool in the evaluation of paint films. The development was part of a general investigation of the adhesion of organic coatings to metal surfaces conducted by the Interchemical Research Laboratories under contract for the U. S. Navy Department, Bureau of Ships.

Provided reasonable care is exercised in the application of an organic coating to a metal, it should not be difficult to obtain a high order of initial adherence. The primary requirement is that the paint medium come into direct contact with the base metal. Thus, both the physical texture of a surface and its cleanliness are important in obtaining good adherence.

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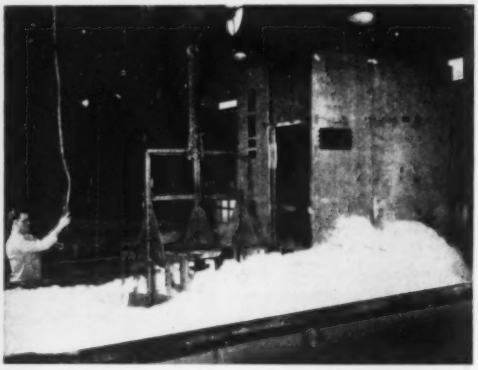
Switchgear Gets Added Protection



CIRCUIT BREAKER frames and metal switchgear housings are shown entering an alkaline bath, first of a series of five baths in 11,000 gallon tanks for protection against rust and corrosion at Westinghouse Electric Corp.'s East Pittsburgh, Pa., plant. The process includes cleaning, rinsing, Bonderizing, rising again and immersion in a stabilizing bath. Entire process takes about 20 minutes. To preserve the full effectiveness of the Bonderizing the units are air dried and sprayed with a primer coat. A plastic coating is added to indoor metal switchgear for further protection and is not removed until the unit is installed

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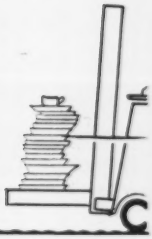

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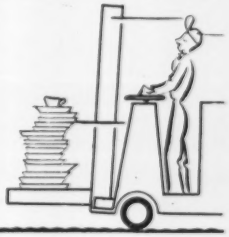

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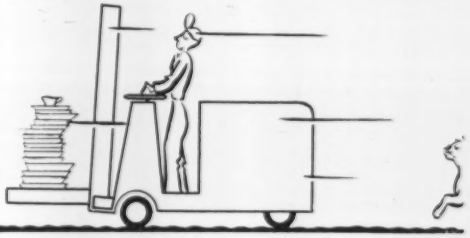

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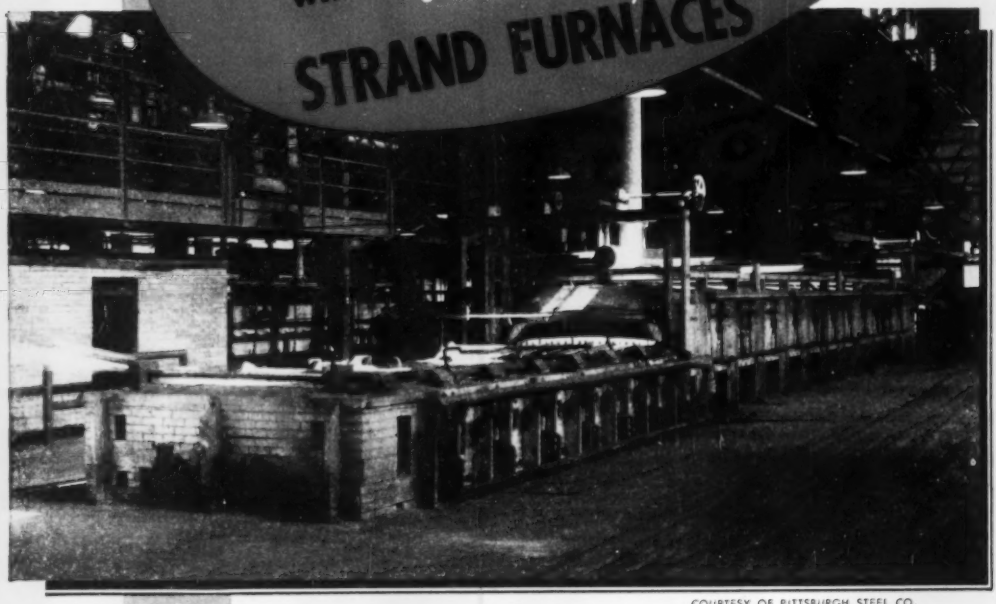

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By GUY HUBBARD
Machine Tool Editor

Seen and Heard in

The Machinery Field

GRINDING WITHOUT TEARS: British schools are provided with textbooks with names such as *French Without Tears*. As that name indicates, they have been designed to impart knowledge in a relatively painless way—if such a feat is possible.

In my estimation, American machine tool builders are doing even a better job than British pedagogues in building books for rapid and painless education—especially for people of machine shop age. I have before me right now a fine example. This is a new textbook entitled *Better Grinding*. A review copy has just been sent to us by D. H. Ruth, advertising manager, Landis Tool Co., Waynesboro, Pa., from which company copies are available to qualified individuals.

This 6¼ x 9½-inch, 84-page textbook is built to stand the gaff in the shop. It is ring-bound to open flat on workbench, tool chest or machine. Its text is brief and right to the point on every shop phase of setting up and operating cylindrical grinders—of which Landis Tool Co. manufactures 21 types.

Text is not the really vital part of this book however. The pictures are what count the most. The text is mostly in the nature of captions for the pictures. I am tempted to say that one unable to read can get a lot out of this book merely by studying the pictures.

These instructional pictures—of which there are no fewer than 96—are 3¼ x 4½-inch mechanically correct but mildly humorous cartoon-type drawings. Humor is employed merely to drive home points in setup and operation which—if ignored—can lead to results which are far from humorous.

That old saying, "Never monkey with a buzzsaw", might well be translated in modern machine shops to read, "Never monkey with a grinding wheel". No modern machine tool is safer than a cylindrical grinder when properly set up and properly handled. These cartoons don't miss a single bet in telling the right ways—and in exposing the wrong ways—in setting up and handling these versatile machines.

Thirty-five years ago I operated a cylindrical grinder in a machine tool plant. I have learned a mighty important lesson from this book. That is that we were doing a lot of things wrong 35 years ago because we didn't know any better. There is no excuse for that now if you will study *Better Grinding*.

ANATOMICAL MACHINING: During a recent tour of Cleveland Pneumatic Tool Co., I was tremendously impressed by the high degree of ingenuity displayed in setups for machining big steel forgings whose shapes best can be described as "anatomical".

This company manufactures landing gear for large aircraft. This statement may connote that these are relatively light components—inasmuch as they fly through the air. Nothing can be further from the truth. They have the weight and stamina of the underpinning for locomotives.

A great deal of boring, drilling, turning and facing must be done on these anatomical parts. A surprising amount of this work is done—and done very successfully—in big engine lathes and turret lathes.

Undoubtedly, Cleveland Pneumatic Tool Co. would like to have more vertical and horizontal boring mills, as who wouldn't these days. In due time they will have them. In the meantime, however, "Pop" Cleveland and his fast-stepping associates have a tremendously important job of defense work to do. They are applying every ounce of their ingenuity to accomplishment of it with tools already at hand. The work is rolling out.

The way these anatomical parts—many of which look like a frozen pair of pants— are mounted in lathes and turret lathes, is extremely interesting. Special face plates carrying shelves to which the parts are bolted, are mounted on the spindles. These face places really are revolving fixtures, many of them being designed expressly for particular parts.

Setups such as this naturally involve a great amount of unbalance. This is overcome by adjustable counterweights mounted on arms fastened to the face plates on the light sides. These are set carefully and even at high speed the assemblies run smoothly.

Naturally, too, all this introduces hazards due to various weights and prongs flailing through the air as the assemblies revolve. Those hazards are neutralized by special rugged guards surrounding face plates and work. There is no fooling about these guards. They must be in place or the machine doesn't run. Any operator who disregards this rule, either would get his brains knocked out, or would be fired. No operator disregards the rule.

Production men at Cleveland Pneumatic Tool Co. don't cry in their beer when they cannot immediately procure exactly the machines specified in the book for work they have undertaken. They improvise.

MACHINE TOOLS TODAY: When the National Machine Tool Builders' Association was organized 50 years ago, its primary purpose was to introduce some semblance of economic order into a small group of rugged individualists just beginning to face stern realities of 20th century big business.

While the machine tool industry itself even today is not big business as we think of it in terms of 1951, it now occupies a position of industrial importance far out of proportion to its size. In that position it is being called upon in these days of crisis to do next to impossible things—in some cases by the same people who not long ago said that machine tool builders are no more important than kettle makers.

To correct numerous misconceptions about the nature and importance of this basic industry, National Machine Tool Builders' Association, 10525 Carnegie Ave., Cleveland 6, has just reissued a brochure entitled *Machine Tools Today*. Many people—including those high in government circles—will do well to read this book. It proves that machine tool builders deserve more co-operation and less condemnation.

Expanded Electronics Program

(*Concluded from Page 83*)

agencies had any data on subcontracting volume, a study was made covering RCA Victor, its manufacturing division. In 1949 this division made purchases from 4800 firms, located in 41 states. Of the total suppliers 79 per cent employed less than 500 persons and 49 per cent less than 100. Together the two groups received about 45 per cent of total dollar purchases. Analysis of government contracts shows a breakdown consistent with the overall figure.

Since this is a partial rather than allout defense effort, production is limited to small quantities to avoid having a large amount of obsolescent equipment on hand in event of a war. With rapid strides being made in electronics development, the period from completion of designs to obsolescence is apt to be short. This fact limits the need for setting up volume production lines in a large number of instances.

Also standing in the way of wholesale participation by metalworking in the electronics program is security. Projects of a highly classified nature are usually confined to one plant or even segment thereof to minimize personnel security risks. Although subcontracting opportunities are limited in these instances, there are still parts that can be and are supplied. In this event it isn't necessary for the supplier company to have any knowledge of the end use of the parts it furnishes. All it does is to furnish the purchasing department of the prime contractor with parts made of specified materials to desired tolerances in the identical manner used for a variety of civilian products.

Can You Do It?—Certain products that must be supplied by the metalworking industry are the subject of a thorough but not entirely successful search by electronics producers. There aren't enough companies with experience in machining magnesium and aluminum to the close tolerances required, and nonferrous foundries capable of casting small and intricate shapes are also needed. Small bearings are extremely tight but there is little hope that these can be supplied by any except the regular bearing manufacturers, and these companies are severely taxed by demands from a large variety of defense and defense-support programs.

Conservation of critical materials presents an opportunity for even small producers with top-flight engineering talent. Military specifications are tough but upon proper presentation, justifiable relaxation in tightness of specs is attainable. RCA's request to conserve nickel by substituting nickel-plated tube leads that were found satisfactory in company tests for solid nickel leads prescribed previously is getting favorable consideration from the Navy. Unfortunately this procedure takes time as the officials responsible for making the decision are hesitant to give manufacturers the green light until they are sure the substitute material will meet the most rugged service requirements.

Shrinking—Miniaturization is the order of the day in electronics. Not only must the equipment be smaller but it must do the job better than its bigger predecessors. Weight and space savings are musts for equipment going to all branches of the service. Ships, aircraft and the foot soldier in the field all depend on an increasing number of electronic units to make them more efficient in combat.

The new walkie-talkie has only half the size and weight of its World War II counterpart but has twice the range of earlier equipment and such stability that twice as many can be used in a given area without interference. Electronic equipment is packed into jet fighter planes or bombers in volume believed impossible a few years ago. The same holds true for naval vessels, tanks and antiaircraft installations. General Motors' AC Spark Plug Division, for example, is building fire control systems for the Army's Skysweeper antiaircraft gun; over 20,000 parts go into the automatic electronic system. To make this equipment practical, it must be compact.

A Natural—Some of this work is ideally suited to firms that are specialists in precision work and have been electronic components suppliers for a long time. One such organization is John Volkert Metal Stampings Inc. located on Long Island. Three-quarters of Volkert's current output is going to the giants of the industry: DuMont, Philco, General Electric, RCA and Sylvania. Many stampings are so small as to take 8000 to the pound and require sample inspections every 15 minutes. Tolerances of ±0.002 are common. Nickel and phosphor bronze, beryllium, stainless steel, and the glass to metal sealing alloys are among the metals used extensively.

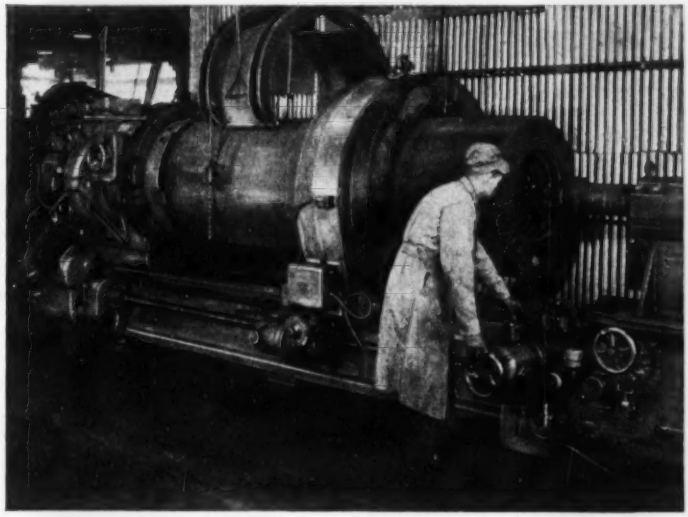
Military electronics production will be a big factor in metalworking in 1952. Many subcontractors and suppliers will be able to find enough work in this field to overcome cutbacks in their normal work but they won't have this work handed to them. V. Adm. E. D. Foster, director of RCA Victor's mobilization planning department, sums it all up when he says, "Government business is no bonanza and getting it requires the same initiative, salesmanship and good management as is required in the highly competitive commercial field."

Steel Scrap: 75 Tons a Day

OPEN-HEARTH slag reclaimed at the Lukens Steel Co. plant in Coatesville, Pa., gives up about 75 tons of steel scrap daily. Lorain Moto-Crane with a 2-yard dragline bucket is used to loosen the slag dump so a Lorain 50 can operate with a 45-inch magnet to separate and pick out scrap

Engineered Rebuilding

How Simmons Methods Increase Machine Tool Output and Efficiency



Redesigned lathe threads, turns and faces large carbon electrodes

Have you an unusual and major machining problem ... one that requires a specially-designed machine tool with built-in features to facilitate operations? If so, Simmons rebuilding engineers may be able to help you as they helped Great Lakes Carbon Corporation, Niagara Falls, New York. Here's how Simmons engineers converted a standard lathe to machine carbon electrodes 10' long x 35" in diameter:

- Bed was lengthened from 18' to 24'
- Lathe was raised to give swing over bed of 54" diameter
- A 36" chuck, automatically operated by air, was built in on headstock
- A motor-operated, rapid traverse was installed for positioning along the bed
- A revolving steady rest was designed with a 38" inside diameter clearance and chuck of 54" outside diameter
- A special carriage was provided with multiple tooling for boring, facing and internal threading

In addition to adding new capacity, Simmons completely rebuilt the original lathe... dismantled it down to bare castings and thoroughly cleaned it ... replaced worn parts ... refinished sliding surfaces.

Give machine-tool rebuilding a priority in your plans for defense and civilian production. You can start by sending us a list of your machines that require rebuilding. We'll promptly quote prices and deliveries and send you case examples of machine tools rebuilt "The Simmons Way."

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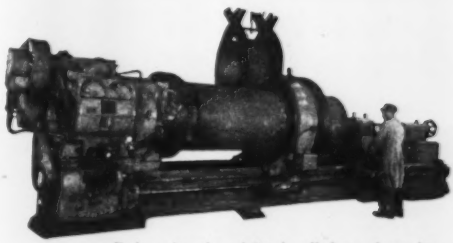
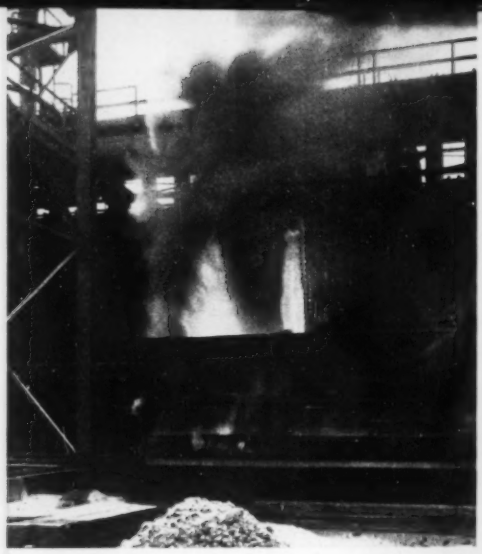


Bed was lengthened 6' to handle large electrodes

SIMMONS ENGINEERED REBUILDING
Gives Machine Tools a New Lease on Life



Pushing by-product coke from oven to quench car at modern installation

By F. A. DUDDERAR
Division Superintendent Coke Plant
United States Steel Co.
Clairton, Pa.

Investigation Discloses Improvement in BEEHIVE COKE

IN the spring of 1951 the United States Steel Co. initiated a program of beehive coke testing in the Pittsburgh district. This program, aimed at increasing blast furnace production, did not take the form of a comprehensive research project, but rather that of a quick evaluation of the characteristics of the beehive cokes as measured by a single testing procedure. No attempt was made to evaluate the relative merits of by-product and beehive coke as blast furnace fuels. Therefore, statements of comparative coke test results that follow are not intended as arguments for the case of either coke but are presented only as interesting comparisons of factual data.

Ovens of a typical beehive plant normally are arranged in long rows which may be of single oven width, with all doors facing in one direction, or double width with the ovens back to back. The individual oven interior is shaped like an inverted mixing bowl and is completely brick lined. In the roof or dome of each oven there is a circular opening, approximately 2 feet diameter, that serves a dual purpose. Through this opening approximately 6 to 9 tons of coal is charged, and through it the burning volatile products escape to the atmosphere during the carbonizing period. No attempt is made to regulate the size of this opening during the normal operations of the oven.

In the front of each oven there is another opening, approximately 2 feet wide and 3 feet high, having straight sides and a straight bottom and a slightly arched top. It is through this opening that the coal is leveled, the air is admitted for burning off the volatile products, the watering pipe is inserted and finally the coke is removed. The size and shape of this opening is changed during the operating cycle of the oven.

A complete operating cycle of an oven includes the following steps, assuming the starting point of a hot empty oven from which the coke recently has been drawn and with the front opening or door completely open. The door is closed to within about 1 foot of the top with bricks layed up dry. The oven then is charged from the larry car running on tracks along the top of the oven row. The coal in the oven next is leveled manually with the use of a long hoe riding on a turn-buckle support wedged between the sides of the door opening. Bricking up the door and sealing the joints with a wet mud then follows until the entire opening is closed except for a small hole at the bottom of the door and a crescent shaped opening in the arch at the top. Within a period of one to two hours the coal absorbs sufficient heat from the oven brick lining to evolve a steady flow of volatile matter which, combining with the air pulled in through the door opening, fires out through the top.

During the carbonizing period which may be 48, 72 or 96 hours, depending on weekend working practices, the rate of burning is controlled by adjusting the size of the crescent shaped door opening, the small opening in the bottom of the door having been closed completely soon after firing begins. At the end of the carbonizing period the door brick is pulled down and a rotating water sprinkler, of much the same design as a lawn sprinkler, is inserted. This sprinkler resting on top of the coke mass with its nozzles pointing downward quenches the hot coke. A drawing

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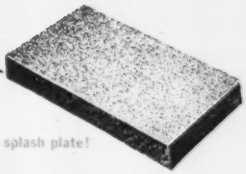
USE NATIONAL CARBON

TRADE-MARK

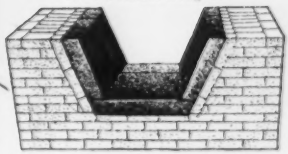
For the cinder notch liner!

For the cinder notch plug!

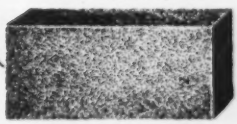


For the splash plate!

For the runout troughs!



For the skimmer plate!



● "National" carbon is now firmly established for blast furnace linings. It is being used outside the furnace as well—wherever there is contact with molten material—for the splash plate, runout troughs—clear down to the ladle—skimmer plate, cinder notch liner and cinder notch plug.

The reasons?

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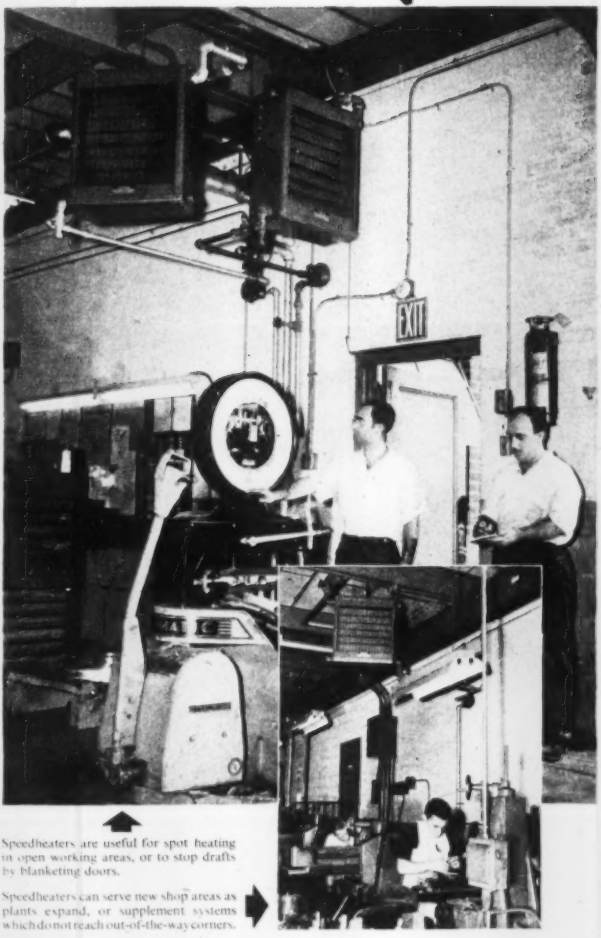
Speedheaters come in 26 sizes, from 25,000 to 400,000 btu. Downblast Speedheaters are available for high ceilings. Contact your nearest Westinghouse distributor, or write Westinghouse Electric Corp., Air Conditioning Division, Hyde Park, Boston 36, Mass.



Speedheaters are useful for spot heating in open working areas, or to stop drafts by blanketing doors.

Speedheaters can serve new shop areas as plants expand, or supplement systems which do not reach out-of-the-way corners.

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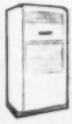
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machine next rakes or draws the coke from the oven onto a conveyor which delivers it onto a screen, and the overpass is discharged into the railroad car.

The foregoing description is for a typical beehive plant and is not intended as a comprehensive story of the industry as a whole. Variations will be found from plant to plant, and some that were encountered in this study were as follows. In some cases ovens had two doors and the coke was pushed rather than pulled from the oven. In some plants no coke conveyor was available and the coke was pulled from the oven onto the ground and bulldozed to the base of a portable inclined belt loader. In other plants the coke merely was pulled out onto the ground, forked manually into wheelbarrows and wheeled to trucks from which it was transferred at another point into railroad cars.

The scope of the study embraced samples of beehive coke from nine United States Steel Co. plants and 16 plants of independent producers. In many plants several coals are used. The facilities for storage and mixing of coals at these plants are limited, and for this reason it was impossible to identify the coke from specific coals. This undoubtedly contributed to the highly variable test results that will be brought out later.

Securing representative samples for testing presented some difficulties and in the final analysis left much to be desired. The sample box was built of wood and measured 2 x 3 x 1-foot deep. This box when filled contained approximately 180 pounds of beehive coke. In plants having conveyors or belt loaders the box was supported on skids spanning the railroad car and the sample taken by sliding the box under the stream of coke coming from the screen. In plants where this equipment was not used the sample was merely forked into the box. Samples were then bagged and transported to the Clairton by-product coke plant for testing.

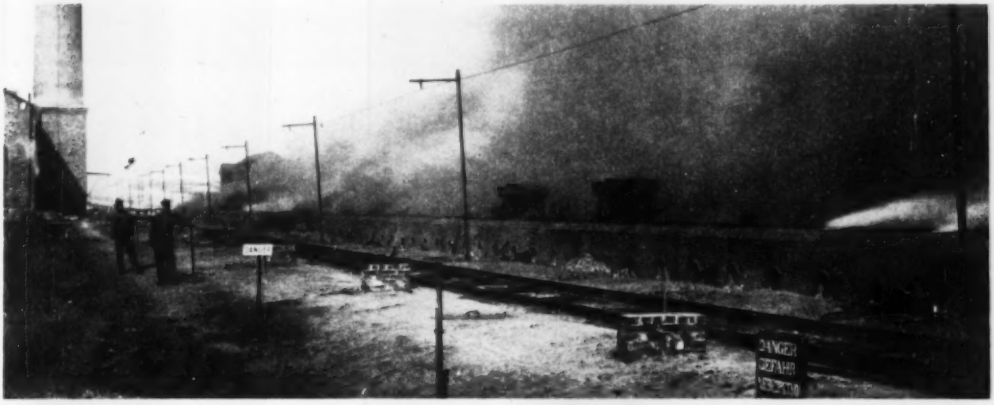
Testing of the coke consisted of a sulphur and ash determination, a screen analysis, and a physical test employing the Clairton tumbler method. The latter test employs a revolving drum 5 feet 9 inches diameter and 2 feet 8 inches long. The rim of the drum is perforated with 1½-inch diameter holes on 2-inch center. Inside the drum and attached to the rim are five 6-foot lifting angles running the entire length. One hundred pounds of coke containing representative quantities of plus 2-inch material, as determined by screen analysis, are placed in the drum and the drum rotated at the rate of 12 rpm for 50 revolutions. Degradation occurs during rotation and a certain quantity of the small size coke produced falls through the perforations in the barrel and is carefully caught. A screen analysis then is performed on the material left in the drum as well as on the material that fell from the drum. Emperical formulas then are employed developing factors called strength, brittleness, and hardness. A final emperical formula combining these three factors with actual percent coke ash gives an index referred to as "fuel value." It should be noted that this term has nothing to do with the Btu value of the material, for this is a common misunderstanding that often results when Clairton fuel value is mentioned.

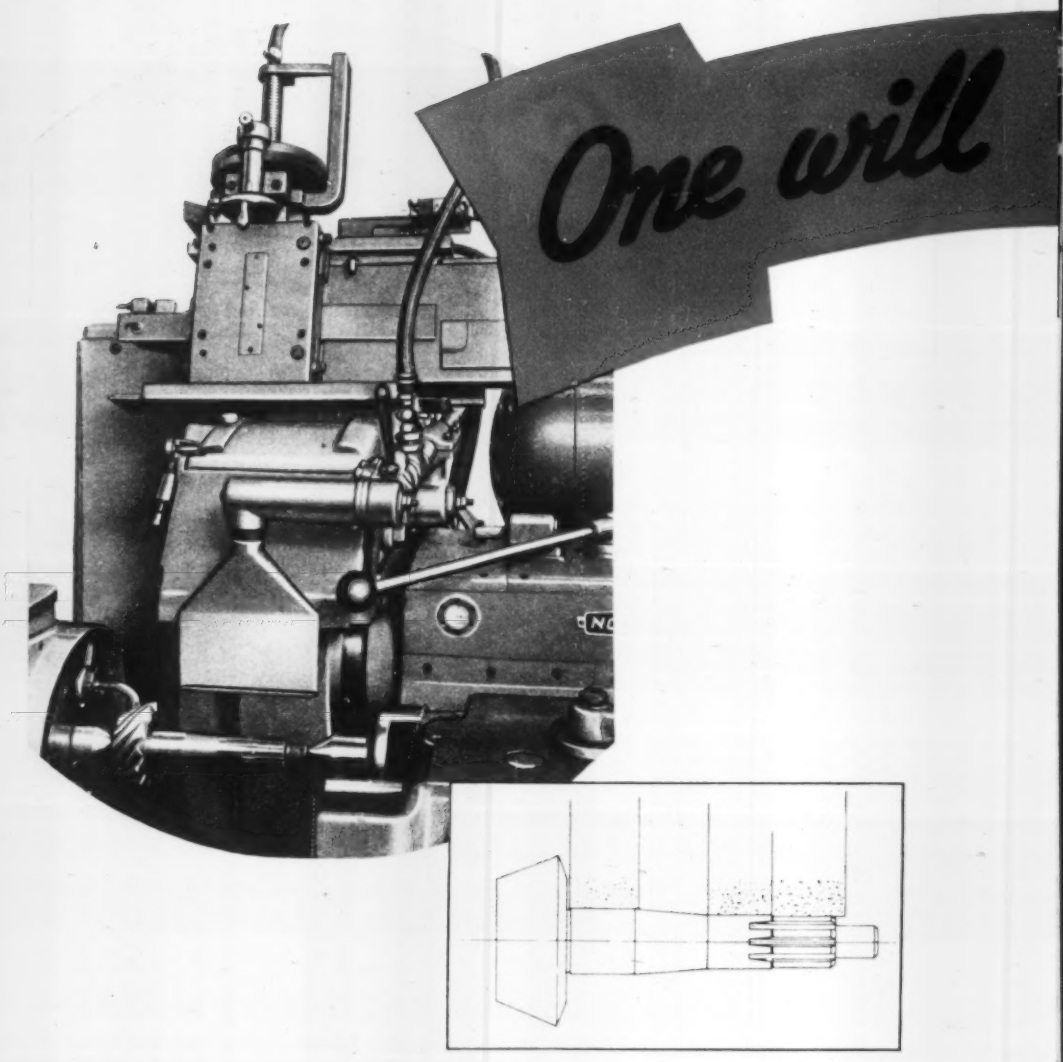
It was impossible to draw unqualified conclusions from the test data but certain interesting observations were made.

1. Variability of the Coke—This nonuniformity was apparent, both from the standpoint of coke produced at a single plant as well as cokes produced at different plants from coals from the same mines. The variable nature of the coke was evidenced both in the chemical analysis as well as in the physical test results. For example, at one of United States Steel Co. plants 72 samples of approximately 180 pounds each were taken on 19 different days spanning a period of three months. The coal carbonized was all from two mines producing from the same coal seam. Results of tests on individual samples showed the following ranges: Sulphur 0.76 to 1.64 per cent, ash 10.00 to 19.90 per cent, and fuel value 45 to 141.

Variations are considerably magnified, particularly on sulphur and ash determination, when looking at individual samples. However, when the averages of the samples taken on each day were inspected, the variability was still great. On no day were there less than three samples taken, and on the majority

Battery of beehive coke ovens top charged by electrically-driven cars





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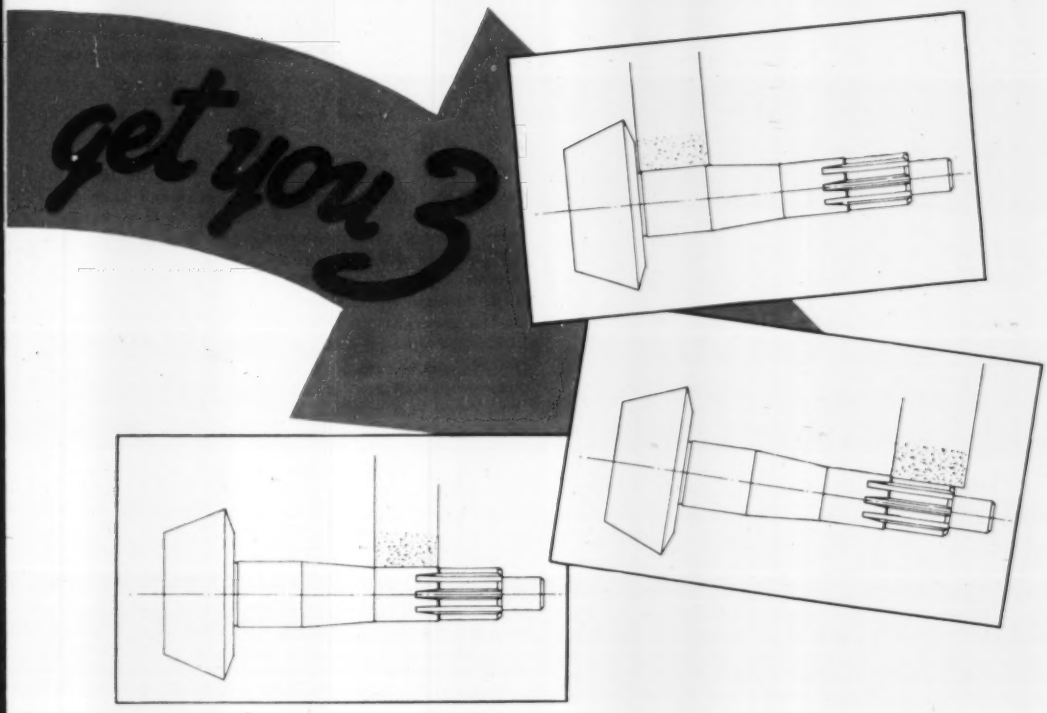

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Replaces 3 Machines . . . 3 Operations

Increases Production 128%

The Problem: to improve the method of producing an automotive part which required grinding on three different diameters. The old method required three operations on three machines and produced only 35 parts per hour.

The Recommendation: Norton engineers suggested replacing the three old-type machines with one new Norton 10" Type CTU Semiautomatic Grinder with multi-wheel mount and automatic truing device — wheel guard type.

The Result: the new Norton Grinder accurately performs all three operations simultaneously at the rate of 80 parts per hour — a production increase of 128%!

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Modernize
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GRINDERS and LAPPERS

of days either four of five samples were taken. Again referring to the same plant, the ranges on daily averages were as follows: Sulphur 0.85 to 1.36 per cent, ash 10.93 to 17.79 per cent, and fuel value 65 to 124.

These extremes do not represent single point exceptions with the balance of the data falling near an overall average. For all three factors (sulphur, ash, and fuel value) the test results fall generally over the entire area between the range limits. It is interesting to note also that the nonuniformity was apparent within a brief operating period. Again at this same plant, samples were taken on five consecutive days with the following daily average results:

No. Samples	% Sulphur	% Ash	Fuel Value
4	1.12	12.72	92
4	1.01	13.31	85
4	0.96	11.24	124
4	0.98	14.02	103
4	0.87	17.78	92

The foregoing data deal with results obtained at one United States Steel Co. beehive plant. These data are typical of the results obtained at the three United States Steel Co. plants where the majority of the testing was done and in general is typical of the entire cross section analyzed; however, to be fair it should be added that some of the plants indicated uniformity better than that cited.

2. Relative Results on Short and Long Coking Time Practices—Early results of the study indicated a definite advantage in favor of the 48-hour coke over the weekend or 96-hour coke produced at the same plant. While this was not as apparent at some plants as at others, it was the general rule. Advantage of the 48-hour coke was apparent particularly with respect to ash content and the strength of the coke as indicated by the fuel value. Evidence from a second U. S. Steel plant brings out this point where samples of 96 and 48-hour coke were taken on seven different days in each case.

	Average Daily Results	
Coking Period	% Ash	Fuel Value
48-Hour	13.2	107
96-Hour	14.3	91

The general situation seemed to be that the 48-hour coke was stronger and contained less ash than the 96-hour coke. As a result of this observation changes were effected in coke burning practices at many of the beehive plants, and later test results have indicated substantial improvement of the 96-hour coke.

3. Sizing—A third observation that can be cited is the generally lower percentage of plus 2-inch beehive coke than plus 2-inch by-product coke when produced from the same coals. About one year ago, at the time when raw coal of the type used in beehive ovens was being carbonized at the Clairton by-product coke plant, the plus 2-inch material ran about 62 per cent of the total furnace coke. Compared to this 62 per cent figure, the corresponding percentages of plus 2-inch material in the coke from the U. S. Steel Co. beehive plants coking the same coals were as follows:

Plant	No. Days Sampled	+2" Furnace Coke, %
1	2	60
2	4	52
3	4	57
4	15	56
5	18	58
6	19	56

By way of further comparison, it is interesting to note that the furnace coke presently being produced at the Clairton by-product coke plant from mixtures of 80 per cent washed high-volatile coals and 20 per cent low-volatile coal is running 70 to 78 per cent. plus 2-inch material.

4. Fuel Values. Noticeably higher fuel values were apparent in the beehive coke than in by-product coke produced from the same coals. Again referring to the period when raw coal was coked at Clairton by-product coke plant, the fuel value of the by-product coke produced averaged about 60 with a range of 55 to 65. Beehive coke produced from this same coal varied, as indicated previously, over a wide range, but averaged around 100. Referring again to the U. S. Steel Co. beehive plants previously mentioned where this coal was coked, the fuel values were as follows:

Plant	Average Fuel Value
1	109
2	103
3	101
4	99
5	91
6	94

In other words, the test data indicated that while there was less plus 2-inch material in the beehive coke than in the by-product coke, this plus 2-inch material yielded higher values when subjected to the Clairton tumbler test. A possible explanation for this seemingly inconsistent relationship could be that a hard, strong coke is produced in the beehive oven but is subjected to excessive degradation in with-

Paper presented at the annual joint meeting of the Eastern States Blast Furnace and Coke Oven Association and the Blast Furnace and Coke Association of the Chicago District, Hotel Statler, Cleveland, Nov. 2-3.

Comparator Ups Bolt Sorting Rate

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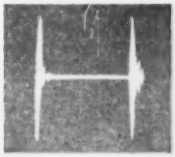

Because production isn't always perfect, inspection of all materials is essential to assure quality. When new inspection tools and methods have demonstrated their usefulness, they replace or supplement the old.

Nondestructive inspection *inside* the metal is now made possible through the Ultrasonic Reflectoscope. The American Brass Company has adapted its use to inspect large plates of copper alloys, thus making doubly sure that *hidden* defects are not present—defects which may appear in machining or forming operations and cause costly rejections.

In keeping with a tremendous mill-improvement program, the introduction of the Ultrasonic Reflectoscope in this industry is another indication of Anaconda's leadership in quality control in the field of copper and copper alloys. The American Brass Company, General Offices, Waterbury 20, Connecticut.

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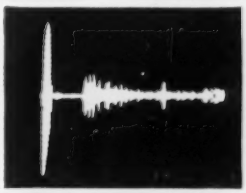

This is what happens:

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drawal from the oven and subsequent handling to the car. Handling of the coke at the beehive plants involved in this last comparison, however, did not appear to be any more severe than the handling to which the coke is subjected at the Clairton by-product plant. This observation, however, is admittedly without the support of any statistical evaluation. Another and perhaps more plausible explanation is that the Clairton tumbler test, designed specifically for the evaluation of by-product coke with its relatively small percentage of the larger sizes (2 to 4 inches and over) does not provide a reliable measure of the relative value of beehive coke with its high percentage of large size material. As previously stated, however, the purpose of this test was not to compare beehive and by-product coke, but rather to compare the various beehive cokes in the hope of effecting improvements.

In summary, it is emphasized that the variability of the beehive coke is undoubtedly a major problem. This variability is readily understandable. Modern facilities are not available to the beehive operator, even to the extent of adequate coal storage facilities for partial leveling of coal quality swings, much less for adequate coal blending. In a 5-day (Monday through Friday) production, two days' product comes from heavy 9-ton 96-hour coal charges, two days' product comes from light 6-ton 48-hour coal charges, and one day's product comes from medium 7½-ton 48-hour coal charges. These figures are approximate, but comprise a definite contributing factor to nonuniformity.

Early results from this test pointed out areas for improvement. That improvements were effected was clearly brought out by later test results. However, this work is only preliminary in nature, and its value will be considered to have been increased if it stimulates further investigation in this field.

Precision Tubing Available

Precision Tube Co., Philadelphia, announces its entry into the field of fine drawn, precision low carbon, welded and drawn steel tubing. This tubing offers the possibility of substitution in many places where nonferrous and alloy metal tubing such as aluminum, copper and copper base alloys were used. It is accurately drawn to close tolerances of inside diameter, outside diameter and wall thicknesses and is available in a range of outside diameters from 0.500-inch to 0.010-inch with wall thicknesses down to 0.0015-inch.

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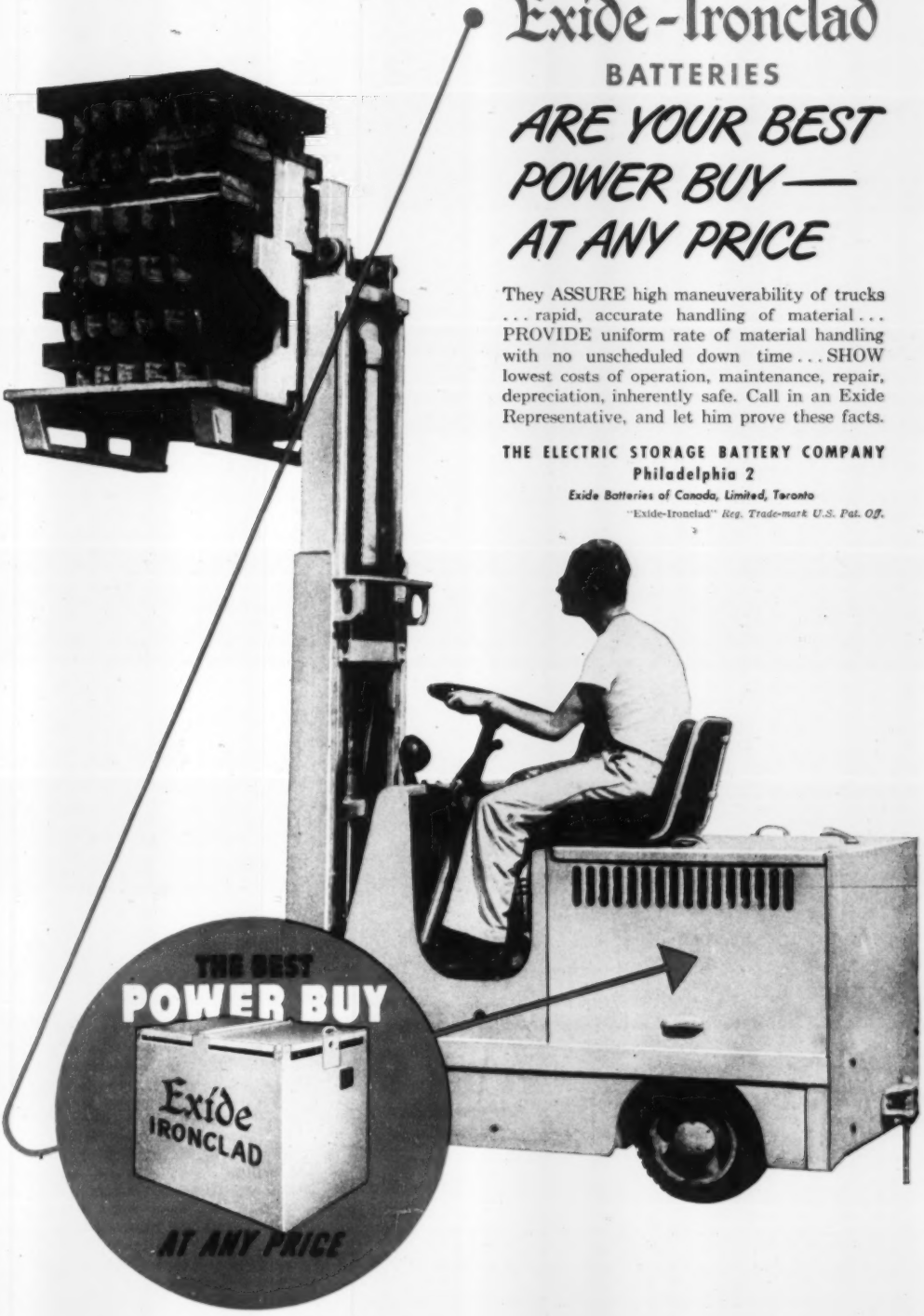
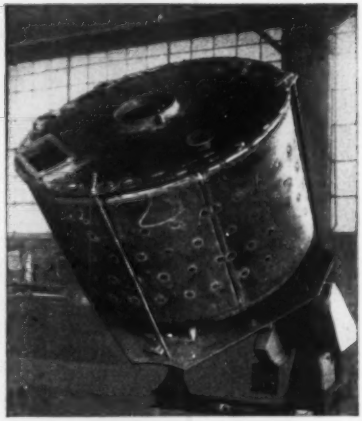
BATTERIES
ARE YOUR BEST POWER BUY— AT ANY PRICE

They ASSURE high maneuverability of trucks . . . rapid, accurate handling of material . . . PROVIDE uniform rate of material handling with no unscheduled down time . . . SHOW lowest costs of operation, maintenance, repair, depreciation, inherently safe. Call in an Exide Representative, and let him prove these facts.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2
Exide Batteries of Canada, Limited, Toronto
"Exide-Ironclad" *Reg. Trade-mark U.S. Pat. Off.*

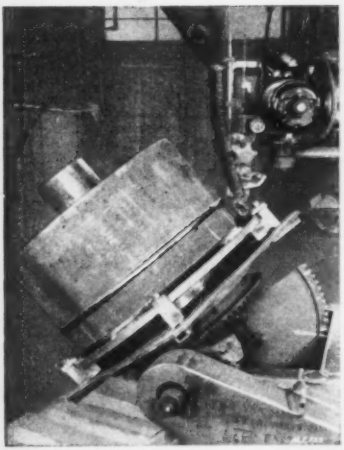




FOR QUALITY WELDMENTS

call in

VAN DORN



• You can be sure of outstanding quality if your weldments are produced by Van Dorn. For Van Dorn has complete fabricating facilities . . . experienced design engineers . . . specially trained workmen . . . 77 years' experience in metal working.

Consult us about your requirements—no obligation, of course. The Van Dorn Iron Works Co., 2685 East 79th St., Cleveland 4, Ohio.

Send For
FREE WELDMENT BOOK

Profusely illustrated; describes the many advantages of Weldments, and Van Dorn's extensive facilities.

drawn tubing can be used on all types of mechanical applications. At the same time, designers and production men will welcome the quick deliveries available on this tubing.

Casting Method Offer Economies

A case study that shows how a unique alloy material, combined with an improved casting design, made possible actual savings of 83 per cent over a six month period, is announced by Stroh Process Steel Co., Pittsburgh. In addition, substantial production savings resulted from elimination of downtime.

On a rolling mill stand of a major steel producer coupling boxes and spindles were wearing out at the rate of one box and spindle each month. To replace them a combination spindle and coupling box unit was cast by Stroh's process. This unit gave six months' service on the same rolling mill stand, resulting in a $700 saving for the period. The producer paid $648 for spindles and $192 for coupling boxes, or a total of $840 for replacement equipment during the previous six month period. Single combination unit cost is $140.

Casting method used to make the combination unit involves casting a tough, austenitic steel alloy on a plain carbon steel base. Since depth, thickness, degree of hardness and location of the alloy can be controlled exactly, it was applied only to spindle wabblers and pods of the coupling-box end. In effect, this provided a piece of equipment with wearing characteristics of a high grade steel casting at a cost slightly more than that of a plain carbon steel casting.

Alloy cannot come loose from the base metal. It does not split, crack or spall; and it will not spread or flow. This casting process also is recommended by the manufacturer for use on large gears, trunnions, sheaves and similar equipment.

Catalog Charts Truck Parts

Model and capacity specifications for gas and electric fork-lift trucks made by Clark Equipment Co., Battle Creek, Mich., are listed in a condensed catalog published by the company's Industrial Truck Division. System of visual cross reference charts makes all essential model and attachment information available at a glance. Specifications included also cover the company's towing tractors, powered hand trucks, hand pallet and platform trucks and hand stackers. Another time-saving feature is an attachment-and-devices cross-reference page that shows all parts on order and to which models they are adapted.

What's your problem?

Meet C. P. Smith, lubrication specialist with headquarters at Standard Oil's Grand Rapids office. He's the man who recommended STANICUT Cutting Oil 107 BC to operators of this plant and helped them make important savings in operating costs.

C. P. Smith is one of a corps of able lubrication specialists who are located in Standard offices throughout the Midwest. They have been specially trained in Standard Oil Lubrication Engineering Schools and in addition, have a wealth of on-the-job experience. The specialist nearest your plant is ready to give prompt, expert, thorough attention to your lubrication problems.

It's easy to obtain his services. A phone call to your nearest Standard Oil Company office will bring him quickly to your plant . . . with no obligation to you, of course. Ask him to explain the advantages of such fine products as:

STANICOOL HD Soluble Oil—Because it contains additional compounding, this soluble oil possesses not only the cooling ability of an emulsion but also the ability to give better tool life and finer finishes than can be obtained with a conventional soluble oil.

STANOSTAMP Compounds—Here are three established products for stamping or heavy drawing operations of either low-carbon or alloy steels. Water can be added to these paste compounds to provide the most economical application. STANOSTAMPS offer maximum protection for dies and work. These compounds can be removed readily in conventional washing equipment.

How one cutting oil cuts costs

Production at this Michigan screw machine products plant includes a wide range of parts made of brass, copper, bronze, aluminum, steel, and stainless steel. STANICUT Cutting Oil 107 BC is used across the board.

Adopted on the recommendation of a Standard Oil lubrication specialist, STANICUT has resulted in a consistently fine finish with no troubles from corrosion. And, since it is used for a variety of operations, STANICUT has resulted in simplified stocking of cutting oils and lower costs.

Consider the job STANICUT is doing for this manufacturer. Then ask yourself: "Why use two when one will do?" Perhaps a single grade of STANICUT can replace two or more conventional cutting oils in your own plant . . . and help you cut *your* costs. A call to your local Standard Oil office is all that's necessary to put a lubrication specialist to work on your cutting oil problem. Why not do it today? Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANICUT
TRADE-MARK
Cutting Oil

STANDARD OIL COMPANY

STANDARD *(Indiana)*

What's your problem?

R. L. Hansen, of Standard's Green Bay office, is the lubrication specialist who recommended STANOLITH Grease No. 42 and helped this processor make important savings.

He and other lubrication specialists are located throughout the Midwest. They are ready to give you prompt and expert attention. If you have a lubrication problem, the lubrication specialist nearest you is the man to see.

He has been specially trained for his job in Standard Oil schools, and in addition, he has plenty of practical experience which qualifies him to give you thorough and reliable service. A phone call to the nearest Standard Oil office is all that's necessary to place him at your service. When he calls, ask him to discuss with you the performance records of the following fine products:

STANOIL Industrial Oils – This general-purpose line of oils provides cleaner operation of hydraulic units and supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

CALUMET Viscous Lubricants – On open gears and wire ropes, these greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of gears, better internal lubrication of wire rope.

Longer bearing life on the "milk run"

Here's evidence of the superior lubrication that a midwest milk processing plant is getting through the use of STANOLITH Grease No. 42. This pump arbor and its anti-friction bearings have been run for a year under conditions of extreme dampness . . .. yet there is no appreciable wear, no corrosion.

High maintenance costs and frequent replacement of bearings in both electric motors and pumps had been a direct result of excess humidity in the plant, until a Standard Oil lubrication specialist recommended the use of STANOLITH. After a test run, it was adopted throughout the plant. Now, after a full year of operation, STANOLITH Grease No. 42 has meant a 50 percent reduction in bearing replacements. Corrosion troubles have been eliminated.

STANOLITH's extreme resistance to water has payed off for this user. For your own application, STANOLITH's heat-resistant properties may be most important. Why not discuss the problem with your own Standard Oil lubrication specialist? Just call your local Standard Oil office for his service. Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Illinois.

STANOLITH
TRADE MARK
Greases

STANDARD OIL COMPANY

STANDARD (*Indiana*)

CALENDAR
OF MEETINGS

November 26-December 1, Chemical Industries Exposition: Grand Central Palace, New York. Manager: Charles F. Roth, International Exposition Co., New York; chairman: E. R. Weidlein, Mellon Institute.

November 28-30, Scientific Apparatus Makers Association: Mid-year meeting, industrial, optical, aeronautical and military instrument sections, Hotel New Yorker, New York. Association address: 20 N. Wacker Drive, Chicago 6. Secretary: Kenneth Anderson.

November 28-30, Society for Experimental Stress Analysis: Annual fall meeting, Bellevue-Stratford Hotel, Philadelphia. Society address: Box 168, Central Sq. Station, Cambridge 39, Mass. Secretary: Professor W. M. Murray.

November 29, American Iron and Steel Institute: Regional technical meeting, Hotel Cleveland, Cleveland. Institute address: 350 Fifth Ave., New York. President: Walter S. Tower.

November 29-30, Annual Pittsburgh Diffraction Conference: Mellon Institute, Pittsburgh. Preliminary program information: C. W. Cline, Aluminum Reseach Laboratories, New Kensington, Pa.

December 5, Steel Kitchen Cabinet Manufacturers Association: First annual meeting, Hotel Cleveland, Cleveland. Association address: Engineers Bldg., Cleveland 14. Secretary: Arthur J. Tuscany.

Dec. 6-7, Agricultural Ammonia Institute: Annual meeting, Hotel Claridge, Memphis, Tenn. Institute address: Box 3041, Memphis 9. President: E. H. Gill.

December 6-8, American Institute of Mining & Metallurgical Engineers: Electric furnace steel conference, William Penn Hotel, Pittsburgh. Institute address: 29 W. 39th St., New York 18. Secretary: Edward H. Robie.

Generator Bulletin Released

Design and construction features of Allis-Chalmers WA-series steam turbine generator units, made in NEMA ratings of 2000 to 7500 kw, are described in a bulletin released by the company. The WA-series units are built in the condensing type, for power generation only, and in noncondensing and automatic extraction types to provide a steam-power balance where process steam is used.

These units are compact, three-bearing, solidly coupled units. Two of the three self-aligning bearings are in the turbine and one is in a bracket on the outboard end of the generator. All bearings are lubricated and cooled by oil supplied by a unit system through accessible piping located above the floor and within the unit. Copies of the bulletin, "WA-Series Steam Turbine Generator Units," are available from Allis-Chalmers Mfg. Co., 1021 S. 70th St., Milwaukee.

Carbon Soldered to Metal

A process announced by Stackpole Carbon Co., St. Marys, Pa., makes soldering carbon to metal as practical, in most cases, as it is to solder metal to metal. By soldering this previously unwettable refractory material directly to metal supports, the user gains all the advantages of carbon for contacts, small brushes, friction devices and many other purposes.

Kinnear Rolling Doors

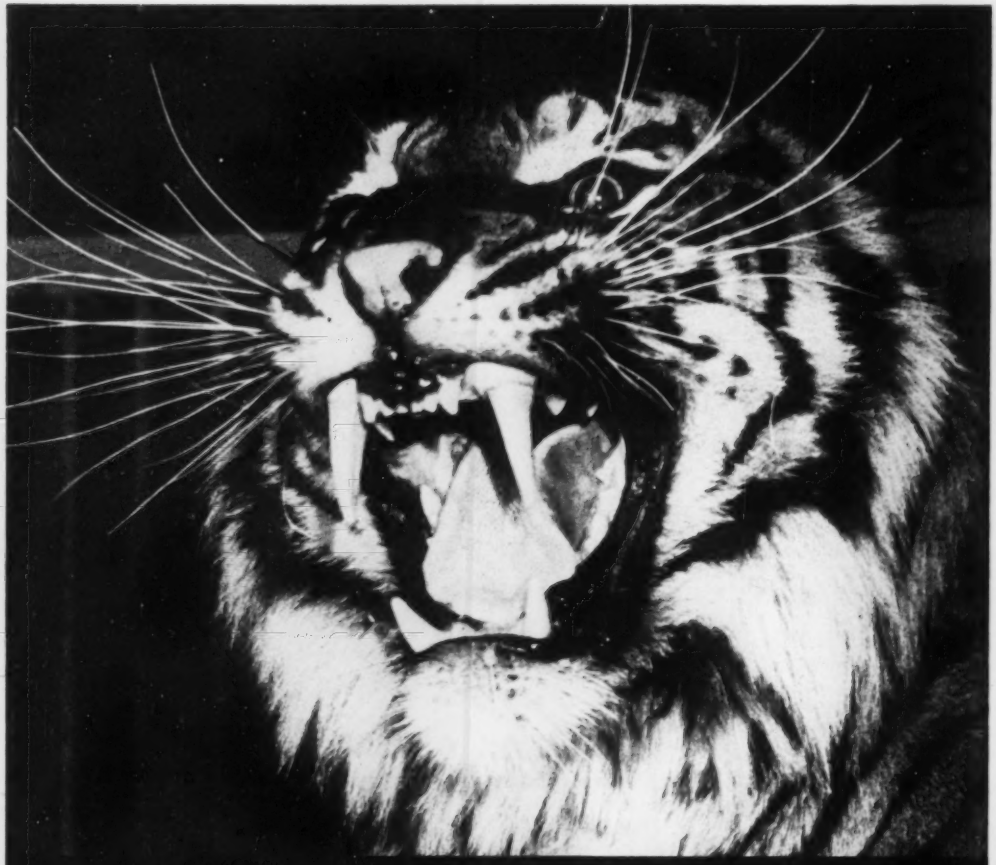
Save money at your service entrances

Installing Kinnear Steel Rolling Service Doors in your service entrances is an investment that quickly pays for itself in at least three ways:
(1) Coiling upward action gives you full use of *all* floor and wall space around doorways. Materials of any kind can be stored within an inch or two of the doors, inside or out, without impeding their operation.
(2) The neat, strong curtain of interlocking steel slats assures long, dependable service and low-cost maintenance.
(3) The all-metal construction of Kinnear Doors gives you extra protection against fire, intruders, wind and storm damage, and other hazards.
By opening straight upward with spring-counterbalanced action, they provide smooth, easy operation under all conditions. They can be equipped for manual, mechanical, or electrical control. Motor operated doors can be equipped with any number of remote control switches, for maximum convenience. Kinnear Doors are built in any size, for easy installation in old or new buildings. Write for complete information.

The KINNEAR Mfg. Co. Factories: 1780-1800 Fields Ave., Columbus 16, O. 1742 Yosemite Ave., San Francisco 24, Calif.

OFFICES AND AGENTS IN ALL PRINCIPAL CITIES

SAVING WAYS IN DOORWAYS **KINNEAR** ROLLING DOORS



Customers greet you like this?

Let us try to help you! Sometimes we can relieve the pressure of customers' demands by suggesting alternate materials or production changes which will help you get more use from the steel you use. Whatever your steel problems may be, why not put them up to United States Steel Supply?

UNITED STATES STEEL SUPPLY COMPANY

Warehouses Coast to Coast

BALTIMORE · BOSTON · CHICAGO · CLEVELAND · LOS ANGELES · MILWAUKEE · MOLINE, ILL. · NEWARK
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Headquarters Offices: 208 S. La Salle St.—Chicago 4, Ill.

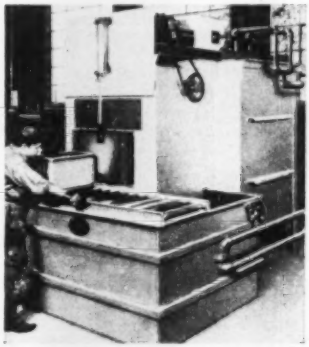
UNITED STATES STEEL

New Products and Equipment

Pitless Batch-Type Furnace

USE REPLY CARD—CIRCLE No. 1

Dow Furnace Co., Detroit, Mich., announces development of a small, pitless batch-type controlled atmosphere furnace for production gas cyaniding, gas carburizing, clean



. . . heats 500 pounds to 1500°F in 1 hour

hardening and carbon restoration. Called model G, the furnace is completely mechanized and self-contained for operating ease and simplified material handling. In operation, the model heats 500 pounds of work from room temperature to 1500° F in one hour if stabilized at control temperature when load is introduced.

Net loads to a maximum of 600 pounds can be processed, the net varying normally with type of parts, temperatures and case depths. Uniform, rapid heating is accomplished by four radiant tubes fired with company's standard burners. Gas generator system of catalytic type incorporated within radiant tubes supplies a gas neutral to medium carbon steels. Generator gas can be analyzed before going into the furnace. Quenching is done directly from the furnace vestibule.

Purifier Clears Vapor Lines

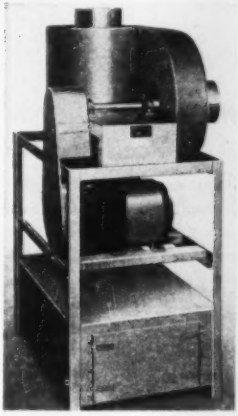
USE REPLY CARD—CIRCLE No. 2

Receiver-type purifier that removes destructive entrainment from vapor lines is offered by V. D. Anderson Co., 1935 W. 96th St., Cleveland 2, O. Its applications include: (1) Protection of turbines and steam engines by removing damaging slugs of entrainment; (2) use in exhaust steam installations where it is necessary to remove oil and other undesirable entrainment and (3) removal of condensate from compressed air systems. The purifier, an addition to the company's Hi-eF line, employs self-cleaning action that cuts down maintenance, and fluid dynamic designing that provides for handling extreme velocities at high efficiency, holding pressure drop to a minimum. In boiler installations it delivers 99.9 per cent quality steam; in exhaust steam it removes 99 per cent of the oil.

Unit Discharges Toxic Air

USE REPLY CARD—CIRCLE No. 3

Air that is cleaned of industrial dust but still contains toxic fumes is exhausted out-of-doors by a dust collector available from Aget-Detroit Co., 139 Main St., Ann Arbor, Mich. Called the model 20ND30 Dustkop, its capacity is 2450 cfm on single 6-inch inlet, with 4.5-inch static suction. Size of the outlet for discharge of cleaned



. . . has capacity of 2450 cfm

air to the atmosphere is 8 inches. Collector is available in standard sizes with motor for operation on either 200 or 440 v, three phase, 25 cycle power, but motors for operation on other power supplies can be obtained.

Welder Has Nine Heat Stages

USE REPLY CARD—CIRCLE No. 4

Trindl Products Ltd., 17 E. 23rd St., Chicago 16, Ill., announces addition of model 80A to its line of alternating current arc welders. The model has a welding range of 20 to 80 amp, handles 1/16 to ⅛-inch rod on work ranging from 24-gage to ¼-inch sheet. Engineering features incorporate nine heat stages adaptable either to the arc welding process or the twin carbon torch method. Lightweight and portable, its applications include on-the-spot repairs and maintenance, operating off 110 v, ac line.

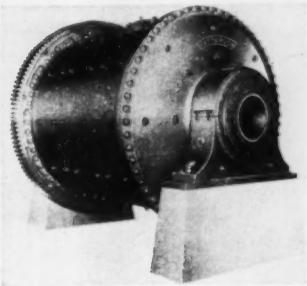
REPLY CARDS

on page 127 will bring you more information on any new products and equipment in this section.

Continuous Ball or Tube Mill

USE REPLY CARD—CIRCLE No. 5

Development of an advanced model heavy duty continuous ball or tube mill is announced by Patterson Foundry & Machine Co., East Liverpool, O. Adaptable to fine or coarse, wet or dry grinding and open or closed circuit grinding, the mill can be used for pulverizing chemical or ceramic raw materials, minerals and numerous finished products. It can

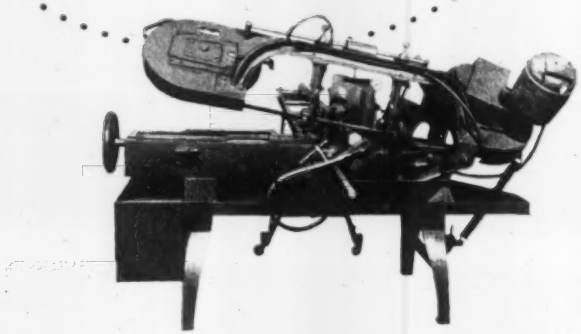


. . . adaptable to fine or coarse grinding

be used to deliver a finished product or operated with the company's classifying equipment. Hollow trunnions are provided for continuous feed and discharge materials.

Among principal design features are cast steel mill heads, slightly conical to provide maximum rigidity and strength with minimum weight. Mill shell is welded steel, drilled for installation of replaceable cast alloy iron or steel lining. Mill is driven through heavy "T" section girth, or ring gear, split and reversible to provide maximum gear life. Gear uses a full-depth 20-degree pressure

Get the advantages of AUTOMATIC BAR STOCK CUT-OFF at a fraction of the cost you might expect



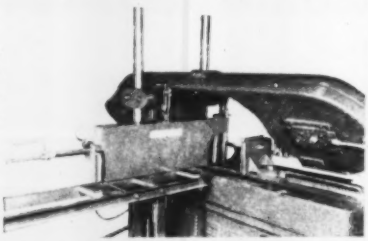
. . . . . with a WELLS SAW and WELLS-O-BAR Feed Master

A set-up for automatic repetitive cutting need not be prohibitively expensive. By combining a Wells Metal Cutting Band Saw and a Wells-O-Bar Feed Master you can automatically cut any quantity of identical lengths of bar stock with a modest investment. Or, a Wells-O-Bar Feed Master can be added to your present horizontal band saw to convert it to an automatic cut-off machine.

For operation the feed unit requires only air at 60 to 80 pounds pressure. Standard feed will project up to 17". The feed mechanism does not interfere with the use of the saw for making single cuts.

See your Wells Dealer for complete information or write direct.

The illustration above shows the Wells-O-Bar unit attached to a Wells No. 8 Saw. At the right is the unit attached to a Wells No. 12 Heavy Duty Machine.



Wells SAWS

Wells

The Pioneers of Horizontal

METAL CUTTING BAND SAWS

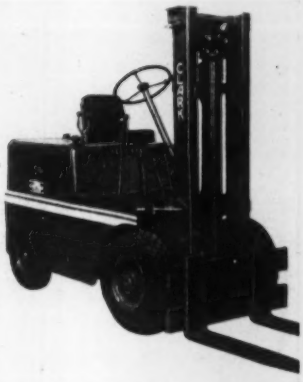
WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN

angle involute tooth form. Main gear meshes with a forged steel cut tooth pinion mounted between heavy duty countershaft bearings. Standard mill sizes range from 2 feet diameter by 2 feet long to 10 feet diameter by 24 feet long.

Fork Lift Is Diesel Powered

USE REPLY CARD—CIRCLE No. 6

Diesel power for the company's Yardlift-40 fork-lift truck is being installed by Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. Diesel engine employed is the Hercules model DIX-4D. It has a bore of 3⅝ inch, a stroke of 4 inches; displacement is 166 inches, giving



. . . saves fuel, cuts sparking danger

brake horsepower of 44 at 1950 rpm. Maximum torque developed is 118 foot-pounds.

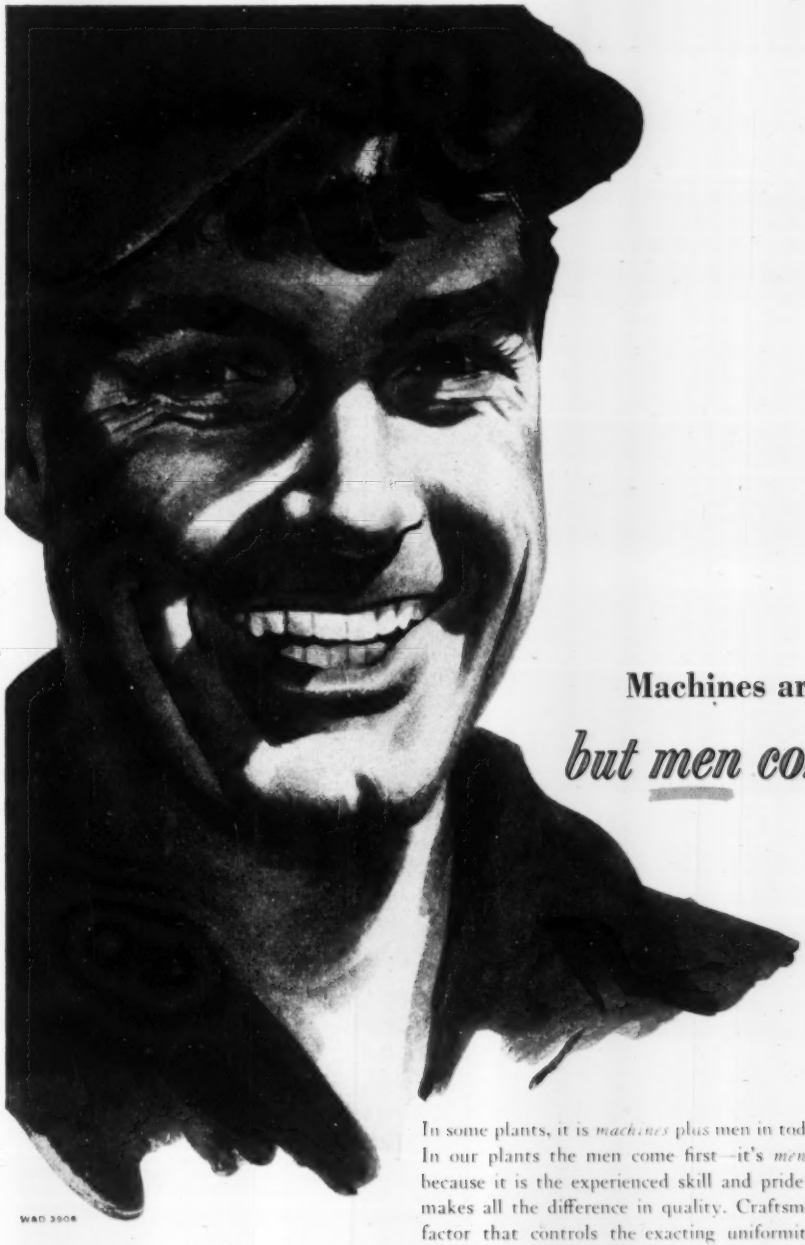
Among advantages attributed to application of diesel power to this forklift line are savings in fuel costs and reduction in sparking danger in areas of high inflammability through elimination of ignition system. Major operating specifications for the truck remain the same as does standard descriptive data such as turning radius, overall width and length.

Cupola Preheats Air

USE REPLY CARD—CIRCLE No. 7

Cupola, called Trumelt, designed to preheat its own air, is introduced by North State Pyrophyllite Co., Greensboro, N. C. In operation a blower forces air into a windbox near combustion chamber's top for preheating. Here air absorbs the heat normally dissipated through the cupola shell. Hot air is then forced downward through insulated ducts into tuyeres that lead into combustion chamber.

Because no extra air-preheating equipment is required, installation



WAD 3908

Machines are vital—

but men come first

In some plants, it is *machines* plus men in today's race for volume. In our plants the men come first—it's *men* plus machines . . . because it is the experienced skill and pride of a craftsman that makes all the difference in quality. Craftsmanship is the unseen factor that controls the exacting uniformity of Columbia and Summerill products.

Columbia STEEL & SHAFTING COMPANY

SUMMERILL TUBING COMPANY DIVISION

PITTSBURGH 30, PENNSYLVANIA

SPECIALIZING IN COLD FINISHED STEEL BARS and SEAMLESS STEEL TUBING

costs compare favorably with that of a conventional cupola. Frequently the combustion chamber can be installed with a stack already in use. Its application indicates efficiency through reduction of machining time required for castings produced.

Self-Priming Motor Pumps

USE REPLY CARD—CIRCLE No. 8

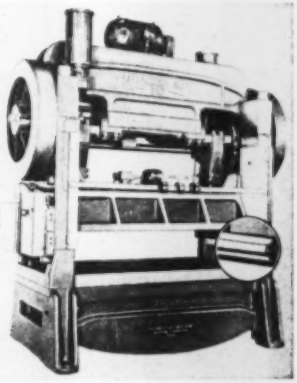
Self-priming motor pumps, in a line intended for pumping applications under suction lift where presence of air or vapor makes centrifugal units impractical, are offered by Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. Pumps are used in process and bulk stations for mine drainage, bilge pumping, sump draining and irrigation. Self-priming line overcomes disadvantage of loss of prime where vapor is present by means of recirculating fluid trapped in the casing. Pump impeller discharges through two passages into a discharge chamber. No flap valve is used because pump casing is proportioned to trap sufficient liquid on shutdown to insure priming when the pump is restarted.

Pump is built in sizes from ¼ to 25 hp, has capacities to 800 gallons per minute and a head up to 180 feet. Standard models have cast iron casing with bronze impeller. They are also available mounted on ball bearing equipped cradles, driven through a coupling by a motor, engine or turbine.

Illuminated Press Beds

USE REPLY CARD—CIRCLE No. 9

Illumination of press beds is offered for its line of presses by Thunder Bay Manufacturing Corp., Alpena, Mich. Fluorescent tubes, placed at each end of the bed, should provide operator better vision to help avoid die breakage. Other press features include: Bed drilled for die cushion installation; ram length



. . . better vision cuts die breakage

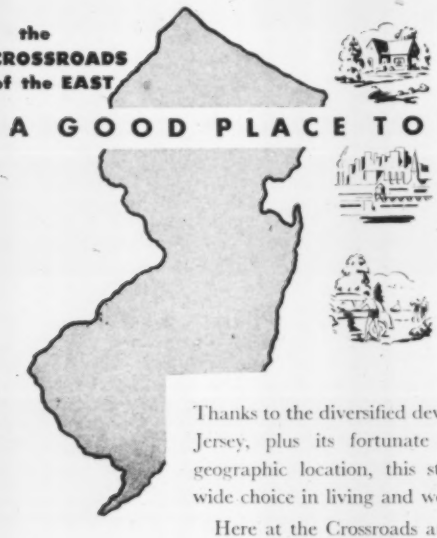
equal to bed length; no gib interference; and large gaps in columns for feeding coil stock from sides.

Standard equipment includes bronze bearings and bushings, crankshaft of No. 6145 SAE heat-treated steel, Rockford friction clutch. Presses have single-stroke non-repeat continuous and inching operations and 4-way solenoid valve with suitable coils for voltage and frequency of current source. Capacities are available in a complete range from 125 to 400 tons.

Automatic Cold Sawing Machine

USE REPLY CARD—CIRCLE No. 10

High speed automatic cold sawing machine made by S. Russell & Sons Ltd., Leicester, England, is offered in the U. S. by Triplex Machine Tool Corp., 75 West St., New York 6, N. Y. Saw uses locked hydraulic feed system, designed to prevent blade from being drawn into work by its own cutting motion. Hydraulic feed also



Thanks to the diversified development of New Jersey, plus its fortunate topography and geographic location, this state offers you a wide choice in living and working conditions.

Here at the Crossroads are busy cities and quiet, country villages; here are bustling industrial areas, located on trunk-line railroads.

Forty per cent of New Jersey is farmland, providing the highest dollar value per acre in the nation, one of the reasons why it is called "The Garden State". Yet, many areas of the state are highly integrated urban centers, related directly with surrounding suburban communities.

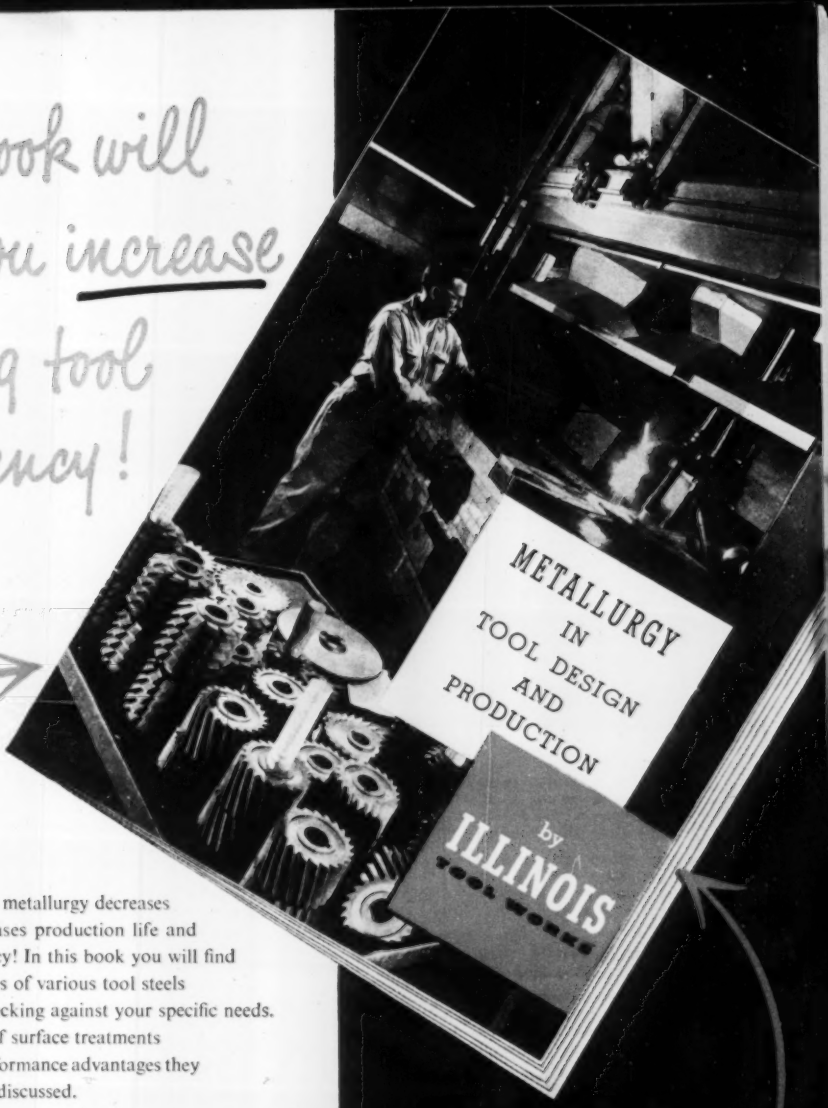
In every respect, New Jersey is a good place to live . . . to work . . . to play.

Write for your copy of the new digest about New Jersey, "An Industrialist's View of the Crossroads of the East." Box F, Public Service, 76 Park Place, Newark, N. J.

PUBLIC SERVICE
ELECTRIC AND GAS COMPANY
NEWARK, N. J.

NEW JERSEY CROSSROADS of the EAST

this book will help you increase cutting tool efficiency!



See how modern metallurgy decreases tool costs, increases production life and improves accuracy! In this book you will find the characteristics of various tool steels tabulated for checking against your specific needs. Different types of surface treatments and the tool performance advantages they give you are also discussed.

Send For Your Free Copy Today!

At Illinois Tool Works, a staff of experienced tool metallurgists and the latest laboratory and processing facilities are at your service . . . ready to help solve your tool metallurgy problems and increase your cutting tool efficiency!

ILLINOIS
TOOL WORKS

2501 North Keeler Avenue
Chicago 39, Illinois

"Headquarters For Engineered Cutting Tools"

IS YOUR SURFACE RESISTANCE LOW ENOUGH?

Are your spot welding costs low enough?

This 18-page illustrated booklet tells how to get better surface preparation of aluminum before spot welding.

¶ Have you tried the latest Oakite recommendations for cleaning and deoxidizing Alclad 24S? 52S? 2S? 61ST-4? XB 75ST? 301? *See pages 3 to 8.*

¶ How long should these alloys remain in the deoxidizing solution? *See Immersion Charts on pages 9 and 10.*

¶ What effects do different immersion times have on resistance? *See Resistance Curves on page 11.*

¶ What's the best rinse temperature after cleaning? after deoxidizing? *See page 12.*

¶ Do you have efficient controls for the concentration and temperature of your cleaning and deoxidizing solutions? *See page 14.*

¶ What advantages should you insist on when selecting materials for preparing aluminum for spot welding? *See page 17.*

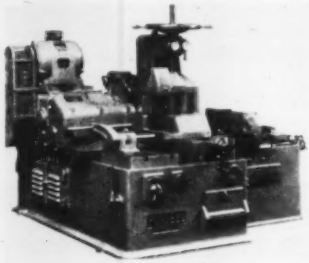
FREE For your copy of "*5 things to know about preparing aluminum for spot welding*" write to Oakite Products, Inc., 34 Thames St., New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

Technical Service Representatives Located in Principal Cities of United States and Canada

permits steady approach and break through, prolonging blade life. Pump and tank unit is a motor-driven assembly housed in the bed. Two pumps are used, each totally immersed in the oil tank. Delivery from pump is infinitely variable within its range.

Saddle is cast iron, stress relieved and provided with adjustable taper gibs working in a narrow guide principle. It houses the entire gear



. . . uses locked hydraulic feed system

drive to the saw spindle. Four-speed gear included in reduction gearing, permit correct cutting speed to suit material to be cut. During sawing, material is clamped by interlocking vertical and horizontal braces, hydraulically operated, eliminating necessity for packing pieces. Machine uses saw blades 22, 24, 26 or 28 inches diameter.

Roof Ventilator Line Expanded

USE REPLY CARD—CIRCLE No. 11

Swartwout Co., 18547 Euclid Ave., Cleveland 12, O., announces an addition to its line of powered roof ventilators. Called the Whirlout, the ventilator is open only when its propeller fan is operating. Air stream is used to open and hold two semicircular halves of the damper during an air purifying process. Fan ring directly above square-tipped blade propeller guides the air stream smoothly without back-flow. The unit is completely weathertight at all times.

Brushless Synchronous Motor

USE REPLY CARD—CIRCLE No. 12

Small synchronous motor that operates on the reluctance principle, with no brushes, slip rings, rotating coils or permanent magnet, is announced by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. The motor was developed by the company primarily for military or special industrial equipment and previously was unavailable to original equipment designers except by special arrangement.

Motor can be built to operate continuously at any voltage below

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STAINLESS
SPECIAL ALLOY
ARMCO IRON

You draw the Shape —Page can draw the Wire

—the way you want it for your production—whether it's ALL of your product, or only a part. Cross-sectional areas up to .250" square; widths to 3/8"; width-to-thickness ratio not exceeding 6 to 1.

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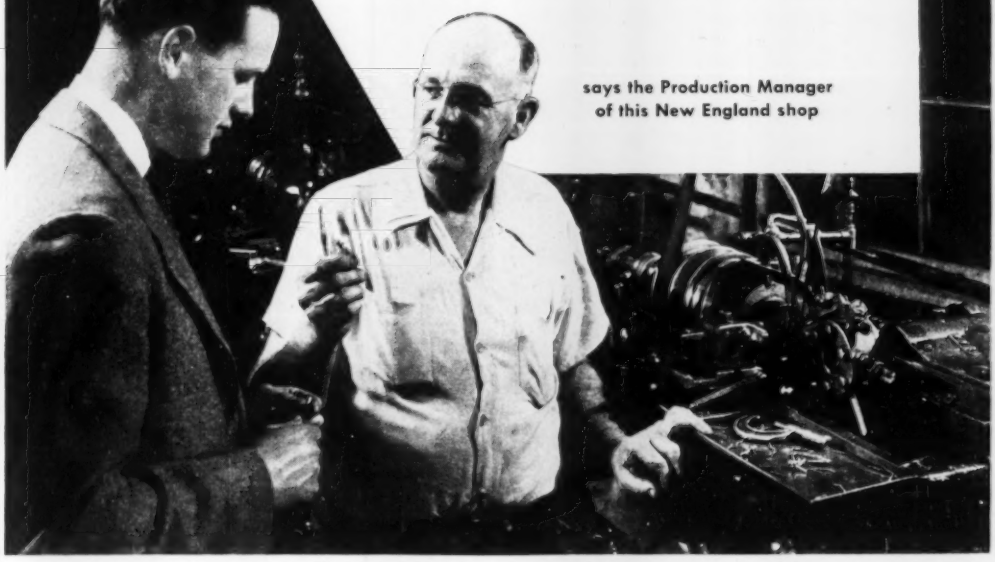
AMERICAN CHAIN & CABLE

"With GULF LASUPAR Cutting Oil

we get 25% more pieces per shift on No. 302 Stainless Steel"



says the Production Manager of this New England shop

"TOOL LIFE on A.I.S.I. No. 302 Stainless Steel parts was such a problem that our production costs were well below the break-even point," says Roy Groth, Production Manager, Groth Manufacturing Company, Plainville, Conn. "Since we switched to Gulf Lasupar Cutting Oil, we increased tool life from 1½ to 8 hours. As a result, instead of 400 pieces per shift, we're producing 500, an increase of 25%."

This is typical of results obtained with Gulf Lasupar Cutting Oil in scores of modern machine shops. Here are the important reasons why: Gulf Lasupar Cutting Oil contains sulphate combined by a special Gulf process which provides greater chemical activity over the entire range of a cutting operation. This means better protection for the tool.

Gulf Lasupar Cutting Oil also contains stable sulphurized fatty oil, effective in producing the fine finishes for which this quality cutting oil is so well known.

Operators like it because they get these production advantages without the disagreeable odor ordinarily associated with sulphurized cutting oils.

Ask a Gulf Lubrication Engineer to demonstrate in your shop the advantages of Gulf Lasupar Cutting Oil and other quality cutting oils in Gulf's complete line. Write, wire, or phone your nearest Gulf office today. Or send the coupon below.

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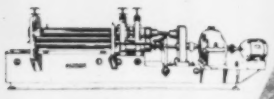
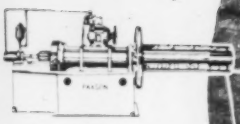
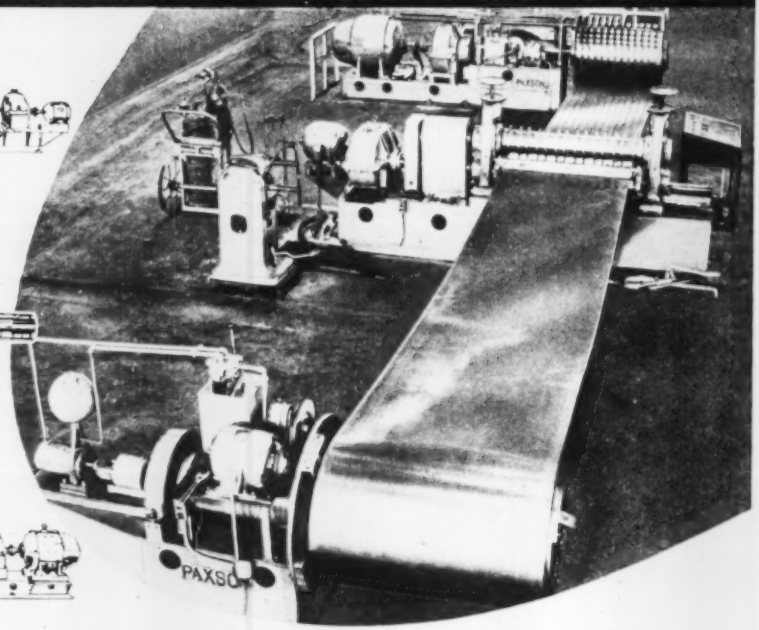


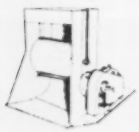
SLITTERS



PAY-OFF REELS

COILERS





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Paxson Slitting Lines are giving top performance for leading manufacturers—coast to coast. Both heavy duty and general duty lines are custom built to meet specific needs . . . Capacities up to 40,000 lb. coils . . . Various power for any required total metal thickness up to 1½".

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Engineers and Builders of Cold-Rolled Strip-Mill Equipment

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5

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250 v, either single or polyphase. A typical unit is 4 inches diameter by 2⅜ inches long, weighs 2.6 pounds, develops 7-ounce-inch starting torque and 0.8-inch synchronous torque. Simplicity of construction provides high shock resistance and holds maintenance to a minimum. No starting equipment is necessary since the motor can start and pull into step at any frequency from 10 to 400 cycles.

Tester Has Compression Fixture

USE REPLY CARD—CIRCLE No. 13

Accessories designed to increase the versatility of the Instron tensile tester are announced by Instron Engineering Corp., 2 Hancock St., Quincy 71, Mass. To permit compression testing, an auxiliary and easily removable crosshead is attached to the frame below the mov-

. . . an auxiliary crosshead is attached

ing crosshead. Compression type load cells have a rigidly attached load-sensitive table. The sample is compressed between this table and moving crosshead. Load deformation, cyclic and relaxation data are available with the same speed and accuracy as is obtained in tensile measurements. Compression tests available extend from 20 grams to 5000 pounds with three load cells.

Micro-Surfacing Jet Blades

USE REPLY CARD—CIRCLE No. 14

Equipment for an automatic, precision-polishing process, called Micro-Lap is offered by Murray-Way Corp., Birmingham, Mich. Process and equipment were developed by the company for fast accurate micro-surfacing of jet engine blades and buckets. Jet blade installations are

Check sheet stock for THICKNESS before it jambs your dies

Make sure sheet or strip stock being released to each stamping, blanking, or drawing operation is the correct thickness for the job. Take a quick thickness check with Federal Model 644. This handy gage is specially designed for speed and accuracy. Spring-loaded jaws clamp the stock . . . locate the gage in the proper vertical position to take the measurement. The checking operation is extremely simple. Just squeeze the grip, insert the stock, release the grip, and take the reading on the dial. That's all there is to it. Write today for complete information and price of Federal Model 644. FEDERAL PRODUCTS CORP., 2111 Eddy St., Providence 1, R. I.

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Indicator Graduated in .001"
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Wet or dry, U·S·S Multigrip Floor Plate provides safe, sure footing for workers, positive traction for vehicles. And sturdy, *permanent* Multigrip will not chip, crack, splinter. Adds greatly to the structural strength of the floor.

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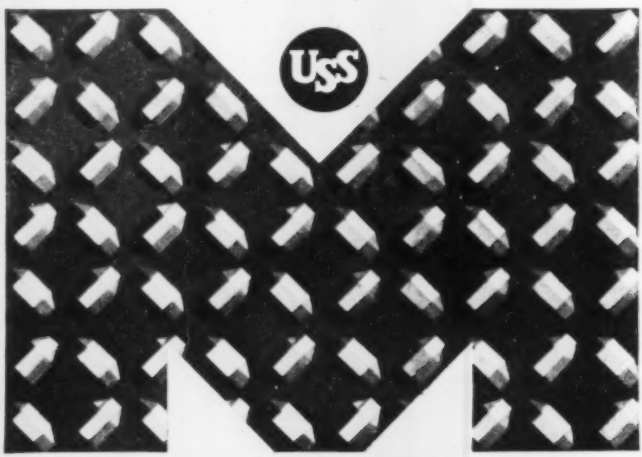

U·S·S MULTIGRIP FLOOR PLATE 1-1145

UNITED STATES STEEL

eight-station, hydraulically indexed on standard orders, however, number of stations can be varied if required. Heads are mounted on floor bases and operate continuously with no indexing pause. Polishing jaws open automatically, receiving and releasing workpiece as it makes the cycle.

Indexing table carries no weight except blade-holding fixtures and blades being processed, a feature that indicates maintenance and wear reduction. A finish of three to four root mean square in a 6-second cycle results from successively finer grits under flood lubrication. Cycle time and individual station dwell times are fully adjustable to meet job requirements. Head stroke can also be changed for longer or shorter blade lengths.

Saw Band for Friction Sawing

USE REPLY CARD—CIRCLE No. 15

Designed for high speed friction sawing, a saw band is announced by DoAll Co., Des Plaines, Ill. The teeth are permanently anchored and locked in place by the use of a special heat treating process. Metallurgical characteristics of the band enable maximum flexation.

Cylindrical Surface Hone

USE REPLY CARD—CIRCLE No. 16

A general purpose hand tool for honing external cylindrical surfaces, any metal, both parallel and tapered, is offered by Universal Power Sprayer Co., Plymouth, Mich. This external hone will remove chatter marks and cross pattern. Each of the two sets will hone outside diameter ranges from ¼ to 3 inches.

Collar Edging Rolls

USE REPLY CARD—CIRCLE No. 17

Collar edging rolls developed by Niagara Machine & Tool Works, Buffalo 11, N. Y., prepare a round sheet metal pipe for joining with a flat sheet. Contour of rolls raises a substantial bead about surface of the pipe and at the same time crimps edge so that it is smaller than pipe diameter.

Interchangeable Drills

USE REPLY CARD—CIRCLE No. 18

Standard space drills that drill the required diameter in one operation from the solid and need no retracting to clear them of chips are available from Conner Tool & Cutter Co., Detroit 3, Mich. Eight sizes of tool holders hold 256 stock sizes of high speed spade drills in sizes 1 to 5-inch diameter in steps of $\frac{1}{64}$-inch. Holders

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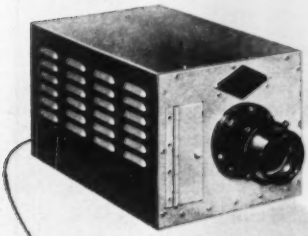
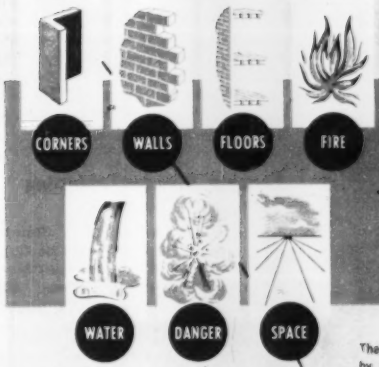
The DIAMOND "UTILISCOPE"

(WIRED TELEVISION)



CONTINUOUS OBSERVATION by "UTILISCOPE" CAMERA



These Are *NO LONGER* Obstacles to Seeing Exactly What Is Happening

The Diamond "Utiliscope" (television which transmits by wire instead of by broadcast) provides a clear, faithful, instantaneous reproduction at a distance of any operation, scene or demonstration. The image can be brought right to the control panel, or desk of the operator or supervisor. Obstacles that prevent direct observation (such as danger, distance, building members, etc.) are not obstacles to the "Utiliscope" which enables you to "SEE where you can't LOOK." There is no measurable time lag and the "Utiliscope" cannot give incorrect information.

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The "Utiliscope" is now in continuous use (24 hours a day) saving labor, improving product quality, preventing accidents and increasing production. Let us tell you about some of these installations that may suggest solutions to your own problems . . . write for Bulletin 1025.

TYPICAL USES— Studying destructive tests of engines • Watching flow of molten steel • Checking remote gauge readings • Observing conditions inside furnaces • Viewing nuclear research • Coordinating materials flow on conveyors.

The "Utiliscope" (Registered U. S. Patent Office)

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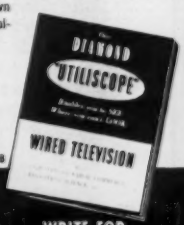

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Frankly, we don't know what uses there are for the "Utiliscope" (Wired Television) in the steel industry . . . so in the adjacent ad we are simply telling you what it will do. Based on our experience in other fields, we suspect there are many places in the metal producing and metalworking industries where the "Utiliscope" will improve product quality, save manpower, prevent accidents or help increase production.

If you want to look into the possibilities of the "Utiliscope", simply write us for a copy of Bulletin 1025F which explains the equipment and shows various applications. Please address your request to Department "F".

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accommodate core drills, both high speed steel and tungsten carbide tipped.

Maintained Position Switch

USE REPLY CARD—CIRCLE No. 19

Typical applications for type A-C-O alternate-contact-operating switch, developed by General Control Co., Boston 34, Mass., are on machine tools, circuit transfer of timers and recording equipment, in safety circuits and as a limit switch. Mounting is either single hole by a $\frac{1}{2}$-inch threaded bushing, or top or side panel mounting with clearance holes for 6-32 screws.

Metal Slitting Saws

USE REPLY CARD—CIRCLE No. 20

A carbide-tipped metal slitting saw for roughing and finishing, slitting and grooving operations in steel, cast iron, aluminum and other nonferrous materials, is introduced by North American Products Co., Milwaukee, Wis. Blades are made from 3 to 18 inches in diameter in widths from 0.085 to $\frac{1}{2}$-inch.

Punches, Dies for Tabletting

USE REPLY CARD—CIRCLE No. 21

F. J. Stokes Machine Co., Philadelphia 20, Pa., offers carbide-tipped punches and carbide-lined dies for all types of tabletting presses. High grade tungsten carbide is used in punch tips and die liners.

Cutting Compound for Metals

USE REPLY CARD—CIRCLE No. 22

C-5 cutting compound, announced by Felt Products Mfg. Co., Chicago 7, Ill., for stainless and other alloy metals is recommended for boring, turning, tapping, threading, broaching, grooving, sawing and other metalworking operations. It prevents galling and pitting of metal surfaces and permits high cutting speeds.

Caulking Guns

USE REPLY CARD—CIRCLE No. 23

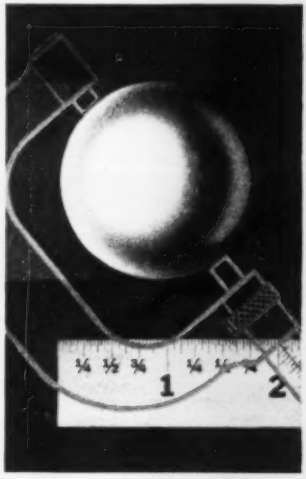
Designated as Rub-Bub Calkezee, a line of caulking guns is announced by Samuel Moore Chemical Co. Inc., Mantua, O. They are available in two models for use with bulk caulk and caulk cartridges.

Portable Radiation Probe

USE REPLY CARD—CIRCLE No. 24

A lightweight radiation probe for detecting and measuring alpha, beta, gamma and neutron radiations is announced by General Electric's Special

ONLY A BALL has { one dimension / one surface



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Important not only in precision ball bearings, but also in the lot of other applications where Strom metal balls have been doing the job better. Strom has been in on a great many ball-application problems, and knows how important these two factors are for the best results.

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Big Advancement in Industrial Weighing

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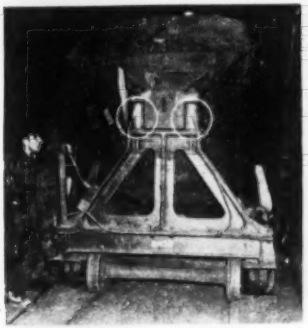
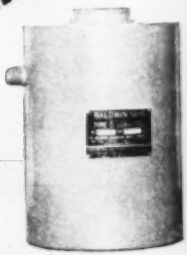
SIMPLIFIES BOTH THE EQUIPMENT, DESIGN AND THE *WEIGHING OPERATION*



● The Ametron Electronic Unit is easily installed in equipment and replaces cumbersome levers, pivots, and bearings of conventional scales.



● There is a cell for large or small capacity installations. In every case accurate results are obtained even under rapid motion weighing.

● The Recording Unit in two models — cabinet or panel — can be placed at any remote and convenient spot so that the weight is seen the instant the products are being weighed. Prints on ticket, tape, or a ledger.

The Ametron Electronic Scale records the accurate weight applied to the load cells by printing on ticket, tape, or ledger sheet. It has applications where weighing is done on steel, iron, and other heavy products—also for railroads, truckers, shippers, mine operators, and factories—whether it is a dormant or motion weighing application.

The unit makes weighing easier, quicker and more exact. Being compact, installation is simple as compared with complicated lever systems. It eliminates problems encountered in maintenance because of accessibility of load cells and interchangeability of cells and recorder components.

The Recorder is a full figure step cam controlled mechanism. It includes provision for multiple ranges to give increased capacity with high sensitivity and accuracy. Both the load cells and instruments are designed to operate over wide ranges of temperature.

Our Sales Engineering Department is prepared to assist you in finding the most practical and economical answer in applying the Ametron Electronic Scale.

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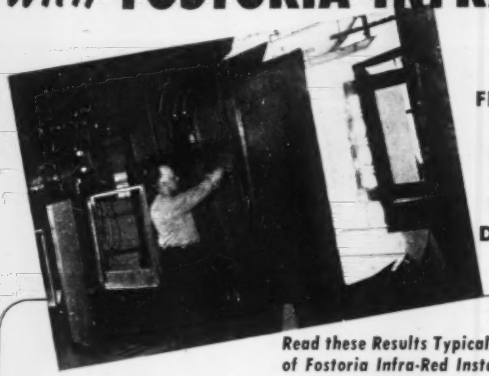
4101 RAVENSWOOD AVENUE CHICAGO 13, ILLINOIS

Branches in Pittsburgh, Pa. and Birmingham, Ala.

Maximum Production in Limited Floor Space with FOSTORIA INFRA-RED for



FINISH BAKING
DRYING
DEGREASING
SOLDERING
PREHEATING
DEHYDRATING
ETC.

Read these Results Typical of Thousands of Fostoria Infra-Red Installations

"When you have limited floor space and want to get out maximum production, this is the only efficient way to do it," says H. O. Buschman, Plant Engineer at Perfection Stove Co., Cleveland. The Fostoria oven requires only half the floor space previously needed for a fuel fired oven. A variety of furnace panels, bases, etc. are now finish baked in 6 minutes at the rate of 80 pieces per hour. The flexibility of the Fostoria oven permits switch control of each bank for full or half voltage to vary heat intensity according to production requirements. All handling is eliminated except at inspection and transfer points.

SAVES SPACE

Fostoria Infra-red ovens operate on a comparatively short cycle which results in smaller oven requirements. They may also be suspended from ceiling mounts to eliminate floor space entirely.

SAVES TIME

Reduces processing time from hours to minutes because of the inherent speed of Infra-red. There is no time lag in starting an oven, the heat is instantaneous.

SAVES MANPOWER—MANHOURS

Ideal for conveyorized production methods. Reduces excessive product handling. Turns out more pieces per day with ease, with less people.

CUTS COSTS

Faster production, lower operating costs, improved quality, result in lowest "per piece" cost.

Throughout industry, new high standards of production efficiency are being set by utilization of the Fostoria Infra-red System. Savings in "per piece" production cost are substantial with many additional advantages on both large and small operations. Whatever your baking, drying, degreasing, or industrial heating problems may be, investigate the high efficiency of Infra-red ovens as engineered by Fostoria. Case histories of installations applicable to your production are available on request.

GET THE FACTS ON FOSTORIA "KNOW HOW" HELP TO REDUCE YOUR "PER PIECE" PRODUCTION COST

Write, today, for this factual information on this Infra-red process and equipment as engineered by Fostoria. Technical data applicable to your operations will be included if you send us general facts about your particular problem. A Fostoria representative will gladly analyze your production needs and submit definite recommendations and carefully forecasted results for your consideration.

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FOSTORIA, OHIO
Oldest and Largest Manufacturers of Industrial Infra-red Ovens

INFRA-RED fostoria SYSTEM

Products Division, Schenectady 5, N. Y. It has application in monitoring contamination of clothing, personnel, laboratory equipment and facilities. The scintillation counter includes a phosphor, photo-multiplier tube and a two-stage amplifier with low impedance output.

Pneumatic Thread Gaging Tool

USE REPLY CARD—CIRCLE No. 25

Designed to speed inspection of threads in tapped holes, a pneumatic thread gaging tool is offered by Keller Tool Co., Grand Haven, Mich. It is used in conjunction with standard taper lock plug gages. It is regularly provided with an adapter to accommodate taper-lock gages with thread diameters from 0.510 to 0.825-inch.

Cleaner for Metal Parts

USE REPLY CARD—CIRCLE No. 26

Magnus Chemical Co., Garwood, N. J., introduces 751, a cleaner for all kinds of metal parts. It will not attack, pit or mar aluminum alloys, bearing metals, cadmium, solder, die cast or other soft metal. The noninflammable cleaner may be used in hot or cold solution and is followed by a cold water rinse after the cleaning period.

Drill Unit Eases Setup

USE REPLY CARD—CIRCLE No. 27

Commander Mfg. Co., Chicago 24, Ill., offers a drill unit designed to provide unlimited freedom of setup to minimize cost and simplify drilling holes at any angle. Powered by a heavy duty flexible shaft, it has hydraulic actuation of the full 4-inch stroke.

Float-Operated Valve

USE REPLY CARD—CIRCLE No. 28

A float-operated valve, announced by McDonnel & Miller Inc., Chicago 18, Ill., is available in three variations. No. 18 consists of the valve mechanism and float. No. 118 is a variation designed to offer protection against back-siphonage and has float mounted at right angles to the

USE A REPLY CARD
Just circle the corresponding number of any item in this section for more information.

Helpful Literature

74. Soaking Pit Carriages

Wellman Engineering Co. — Features of Wellman soaking pit cover carriages, built in variety of sizes and designs to suit any installation, are outlined in 4-page illustrated bulletin No. 143. Making use of antifriction bearings, carriages have four, six or more points of support for cover.

75. Motor Driven Compressors

Clark Bros. Co.—CMA Balanced/Opposed motor-driven compressors built in 8, 14 and 17-in. strokes and covering range from 150 to 2500 bhp are described in 50-page booklet No. 118. Construction, parts and component assemblies are shown with numerous complete, exploded and cutaway illustrations. Specifications are tabulated and many installations are pictured.

76. Handling Equipment

Barrett - Cravens Co. — Line of equipment for floor level handling of materials is illustrated and briefly described in 4-page bulletin 5191. Included are rider and walkie type electric fork platform and lift trucks; tractors; Steeleg skids; portable elevators; storage racks and hand trucks.

77. Tube Fittings

Crawford Fitting Co.—Complete line of leakproof Swagelok tube fittings available in brass, aluminum, steel, stainless and Monel are described and illustrated in 12-page catalog B-151. Dimensions, cross-section drawings, recommended installations and assembly instructions are included.

78. Microscopes

R. Y. Ferner Co.—28-page illustrated booklet SM1000B describes Cooke line of general-purpose, binocular, research, metallurgical, stereoscopic, polarizing and universal microscopes and accessories. Specifications of each are given. Six-page folder covers Vickers projection microscope and presents data on recent trends in metallograph design.

79. Honing Machines

C. Allen Fulmer Co.—16-page brochure "Honing Machines" offers considerable descriptive and illustrative data pertinent to these machines whose typical applications include honing of cylinder blocks, connecting rods, blind end cylinders, hydraulic cylinders, four-way valves and gears. Specifications and body size data are tabulated.

80. Office Chairs

Harter Corp.—24-page booklet "No Wonder They Recommend Harter!" illustrates company facilities for production of office chairs and other formed tubular parts and assemblies.

81. Carbide Welding Rod

Victor Equipment Co.—Suggested applications for Tungsmooth tungsten carbide welding rod for acetylene and electric welding are tabulated in 4-page bulletin 324. Smooth, thin or thick deposits can be made readily with this fine-mesh rod.

82. Dry Gasholder

General American Transportation Corp.—Advantages of Wiggins gasholders used for most chemical process and industrial gas storage applications are presented in 12-page illustrated brochure WG-22. Units can be built in any size from experimental 50 cu ft to industrial 10 million cu ft models.

83. Copying Equipment

Charles Bruning Co. — Specifications and other information on the model 20 Copyflex are given in 4-page illustrated bulletin A-2009. This machine quickly copies practically anything that is written, drawn, typed or printed on translucent paper. Both cut sheets and roll stock up to 42 in. wide can be used.

84. Fastener Devices

Eaton Mfg. Co., Reliance Div.—General information on Reliance fastener devices, including Springtites, Sems, spring lock washers, and snap, bearing, lock and retainer rings, is found in 4-page illustrated catalog 4a/EA. Data on cold-finished steel and engineering services of company also are given.

85. Self-Opening Die Heads

Eastern Machine Screw Corp.—"Camming for H & G Self-Opening Die Heads" is title of illustrated 4-page brochure which gives application information for Brown & Sharpe, Davenport, Warner & Swasey, National Acme, Cone and New Britain automatics.

86. Positioning Control

Conoflow Corp.—Details of the Cono Rotomotor pneumatic gear-driven operator for throttling control service are given in 8-page illustrated bulletin C-1. This actuator is usable for heavy duty service on catalyst slide valves, large gate valves, heavy dampers and similar controls.

FOR MORE INFORMATION USE ONE OF THESE CARDS . . .

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87. Tracer Controlled Machines

George Gorton Machine Co.—64-page illustrated idea manual "Applications of Tracer Control" includes specific descriptions and production facts about more than 140 jobs which utilize tracer controlled machines. Pantograph controlled etching as well as tracer-controlled duplicators, high speed vertical milling machines, horizontals, universals and improved Swiss type automatic screw machines are covered.

88. Die Springs

Die Supply Co.—How Die-Co die springs outperform others as much as three-to-one is told in 8-page illustrated spring bulletin 1951. List of almost 500 stock sizes is included, along with separate listing of die accessories.

89. Expanded Metal

Penn Metal Co.—"How to make a little metal go a long way" is theme of 24-page catalog No. 493 EM which shows and suggests many applications of expanded metal meshes. Emphasis is placed on savings of steel and critical metals while still providing free passage of light and air, as well as on decorative effects.

90. Swiss Pattern Files

DoALL Co.—Featured in 8-page illustrated brochure No. 51-821 are Heller Swiss pattern files of diemaker, machine, needle and riffler styles. Various types are described and sizes available are included.

91. Metal Fasteners

H. M. Harper Co.—56-page, 4½ x 9-in. catalog is illustrated "Price List and Stock Book of Everlasting Fastenings." It lists various types of nonferrous and stainless steel bolts, nuts, cotter pins, screws, rivets and washers.

92. Record Storage Files

Convoy, Inc.—Typical installations of Chem-Board record storage files made from chemically impregnated 350-lb test corrugated fiberboard are pictured in pocket-size folder SF-17 which opens up into 12 x 12-in. broadside.

93. Mechanical Tubing

Babcock & Wilcox Tube Co.—"Hundreds of Different Parts" is title of 4-page illustrated bulletin TB-324 which outlines types, analyses, sizes and properties of mechanical tubing and suggests possible uses.

94. Three-phase Spot Welders

Federal Machine & Welder Co.—Operational data, general information and specifications of series FC aircraft type three-phase spot welders are contained in 6-page illustrated folder. Press type unit can be furnished with one of a number of interchangeable electrode and holder arrangements.

95. Recording Oscillograph

Consolidated Engineering Corp.—Type 5-114 recording oscillograph described and illustrated in bulletin CEC-1500B records data of both static and highly transient or cyclic nature. Features such as record drive, timing and automatic numbering systems and trace identification are covered, along with specifications for 7-200 series galvanometer, the heart of the oscillograph. Also included is data on accessories and associated equipment.

96. Industrial Transportation

Easton Car & Construction Co.—Various types of industrial transportation equipment are shown in 6-page illustrated catalog 2. Included are off-highway trailers and truck bodies, mine and quarry cars, rocker dump cars and trailers, light industrial cars and trailers, electric industrial trucks and heavy duty industrial cars and intraplant trailers.

97. Special Fastenings

Cleveland Cap Screw Co.—"Specials by Specialists" is 4-page illustrated folder which shows typical small parts and fasteners which can be produced to specification by upset and extrusion methods. Application of Kaufman double extrusion process to making cap screws is explained. Production facilities of company are covered.

98. Industrial Air Compressors

Cooper-Bessemer Corp.—Type M line of motor driven industrial air compressors is subject of 4-page illustrated bulletin M-65. Units described range from 250 to 1000 hp with standard two-stage design and 300 to 1000 hp with standard single stage construction.

99. High Frequency Generators

Bogue Electric Mfg. Co.—8-page illustrated bulletin 440 deals with design, specifications and applications of 400-cycle high frequency generators in single and three phase type with outputs from 100 w to 600 kw. Portable and stationary models are available.

100. Alloy Steels

Wheelock, Lovejoy & Co.—32-page pamphlet entitled "Alloy Steels" is application guide covering quality, heat treatment, physical properties and common uses of Hy-Ten AISI and SAE alloy steels. Most of data are tabulated for quick reference.

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9	29	49	69	89
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11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100

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valve so valve proper is always above water level. No. 518 includes float and valve in a die cast chamber with a cover and is designed for external applications.

Pistol-Type Bore Gage

USE REPLY CARD—CIRCLE No. 29

Nilco pistol-type bore gage, developed by Nilsson Gage Co. Inc., Poughkeepsie, N. Y., is for checking bores on the machine by the operator where space is limited and it is impractical to use a standard length bore gage. Features include positioning of indicator to proper angle so that it will face the operator at all times and the adjusting of the handle to proper checking depth.

Reversing Drum Switch

USE REPLY CARD—CIRCLE No. 30

Allen-Bradley Co., Milwaukee, Wis., offers a compact reversing drum switch, bulletin 350, style A, for machines and equipment needing an across the line starting and reversing switch for the alternating current and direct current motors rated at 2 hp or less. Contacts are cadmium silver alloy.

High Pressure Pump

USE REPLY CARD—CIRCLE No. 31

A high pressure triplex pump is introduced by Kobe Inc., division of Dresser Equipment Co., Huntington Park, Calif., is a heavy-duty packaged hydraulic power generator for all types of hydraulic power systems. It is available in 15, 30 and 50 hp sizes with pressure ratings up to 5000 psi and displacement ratings up to 60 gpm.

Stacked Retaining Rings

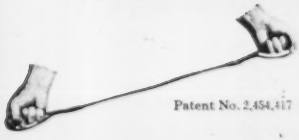
USE REPLY CARD—CIRCLE No. 32

One at a time dispensing and application are featured in stack open-type retaining rings that reduce assembling time. Developed by Industrial Retaining Ring Co., Mt. Vernon, N. Y., rings are stacked on a specially designed base that hold stack erect. Made from carbon spring steel, they provide shoulders on grooved circular shafts.

USE A REPLY CARD

Just circle the corresponding number of any item in this section for more information.

MAKE THIS TEST YOURSELF...WITH A FREE Tuffy SLING



Patent No. 2,454,417

Tie a knot in a Tuffy Sling, then pull it tight with both hands and feet. See how flexible it is — and how it straightens out without damage. The secret is in the braided fabric construction — a patented Tuffy feature!

Scores of wires are stranded into 9 parts, then machine woven into an interlaced wire fabric entirely unlike conventional wire rope slings. Even cutting one of the 9 parts does not result in stranding. And eye splices develop up to 95% of the fabric strength.

11 Types of Tuffy Slings If none of the 11 factory packaged Tuffy Sling types exactly meet your needs, Union Wire Rope engineers will develop one that does. Tuffy Slings are proof-tested to twice safe working load. The safe working load is stamped on a metal band attached to each sling. If you have your own rigging loft, Tuffy braided fabric is available by the reel.

MAIL COUPON TODAY FOR YOUR FREE SLING
This special 3-foot sample is yours without cost so that you can prove to yourself the advantages of a Tuffy Sling. Just mail the coupon.

UNION WIRE ROPE CORPORATION
Specialists in Wire Rope, Braided Wire Fabric and High Carbon Wire
2160 Manchester Ave. Kansas City, Mo.

Gentlemen: Please have my Union Wire Rope Fieldman deliver my *free* Tuffy sling sample.

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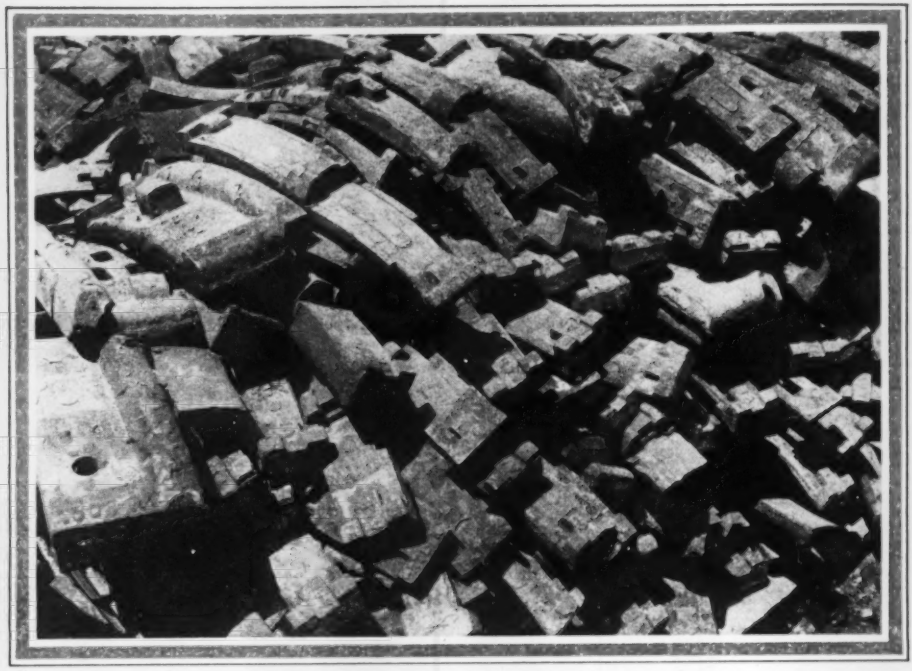

cast iron brake shoes

use:

Cast iron brake shoes are used in the Cupola Furnace as a part of the gray iron mix. This type of scrap contributes both cast iron and steel, which the shoe is lined with, and its consistent chemical character assures a stable melt. They are also used in the casting of new shoes.

source:

Scrapped brake shoes from locomotives and railroad cars.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by personnel who is steeped in every phase of scrap knowledge, is ready to meet your every scrap problem.

specifications:

Cast Iron Brake Shoes. Driving and/or car brake shoes of all types except composition filled shoes.

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SAN FRANCISCO, CALIFORNIA — 300 Montgomery St.
SEATTLE, WASH. — Smith Tower

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

The Market Outlook

SHORT scrap supply presents increasingly serious threat to sustained capacity steel production through winter. Progress attending the government-sponsored drive to build stocks is being offset in some degree by the drying up of some normal supply sources. Industrial scrap generation continues to decline with manufacture of consumer durable goods still contracting. And the slack is not being made up by the defense industries as quickly as had been hoped. On top of this, inclement weather has slowed collections, preparation and shipments over a wide area of the country the past couple weeks.

CONSUMPTION— Current scrap inventory of the steel mills is best described as spotty. Stocks at some plants are very low and still shrinking. Other mills are adding to their accumulations. Generally, however, supplies fall far short of 60 days, normally considered safe working margin. Inventories of a number of mills are so depleted they are working on virtually a day-to-day basis. High level production has been maintained at some distress points only through extensive government allocation of stocks from other producing districts. Consequently, increasing dependence is being placed on the government scrap drive with winter just beginning. Efforts are being intensified to maintain the drive under full steam since it is seen as providing the chief hope for averting sharp curtailment of production in the not distant future.

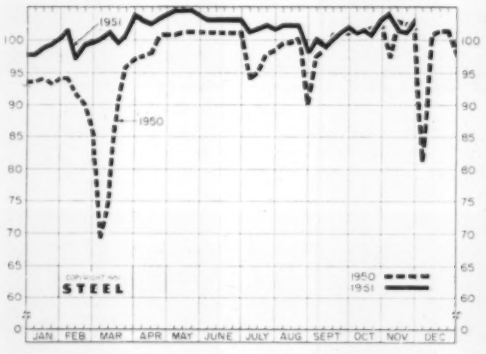
DEMAND— Divergent trends in demand are noted. Defense requirements are rising at the same time pressure for tonnage from consumer durable goods manufacturers is easing with allotments for first quarter cut further. These cutbacks are being reflected in noticeable easing in supplies of light, flat-rolled products. Spot tonnages of sheets are reported being offered fairly freely with some mills actively soliciting orders. One midwest mill disposed of 1800 tons in the East last week. Wiremakers also are reported looking for orders for some grades, including spring wire. Bar demand continues just as strong as ever with defense requirements expanding steadily. Structurals are sold out for first quarter and the same is true of plates. Additional light plate orders are being diverted to the continuous mills.

BALANCE— Despite noticeable easing in some areas of the market demand-supply balance is not expected until after mid-1952 at earliest. Much of the slack in demand now being experienced, stemming from cutbacks in civilian goods, is expected to be taken up shortly on defense account. Although auto builders are getting out of the high-priced conversion steel market as quickly as possible, demands for conversion steel are reported coming in from other directions, notably farm implement manufacturers. Overall needs for steel, generally, will tax capacity production for months to come. Meanwhile, however, indications are the market will present a much more orderly appearance in first quarter than it has in past months. Contributing to this are refinements in Controlled Materials Plan administration which promise to effect closer balance between allotments and production. Also, a recent ruling of NPA permitting producers to postpone booking A and E rated orders until the beginning of a following quarter if their mill schedules are filled, will make for more orderly scheduling. Up to now such orders had preference and could be inserted on capacity already committed.

PRICES— No changes in steel and related product price schedules are anticipated until steel wage negotiations are completed. Expectations are prices will rise in event the wage line gives way again. Meanwhile, STEEL's weighted index on finished steel holds at 171.92, as does the arithmetical price composite at $106.32.

PRODUCTION— With steelmaking operations in the Birmingham district jumping 50 points to 100 per cent of capacity, or close to the prestrike level, the estimated national ingot rate last week advanced two points to 103 per cent of capacity. This is equivalent to production of about 2,060,000 net tons.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Nov. 24	Change	Same Week 1950	Same Week 1949
Pittsburgh	102.5	+ 0.5	103	79
Chicago	106	0*	105	79
Mid-Atlantic	101	0	100	80
Youngstown	106	0	102	90
Wheeling	99	0	99.5	99
Cleveland	102	+ 3*	101	91.5
Buffalo	104	0	104	101
Birmingham	100	+ 50	100	82
New England	90	0	91	87
Cincinnati	103	0	103	60
St. Louis	91.5	+ 3	93	87
Detroit	106	+ 2*	106	101
Western	102	0	101	71
Estimated national rate	103	+ 2	102.5	80

Based on weekly steelmaking capacity of 1,999,634 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950; 1,843,516 tons for 1949.

* Change from revised rate for preceding week.

The Metalworking Outlook—p. 45 Production-Engineering News—p. 81

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Nov. 21 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	171.92	171.92	171.92	157.76	112.04
Index in cents per lb.	4.657	4.657	4.657	4.274	3.035

ARITHMETICAL PRICE COMPOSITES:

Finished Steel, NT	$106.32	$106.32	$106.32	$95.09	$64.45
No. 2 Fdry, Pig Iron, GT	52.54	52.54	52.54	49.54	28.17
Basic Pig Iron, GT	52.16	52.16	52.16	49.04	27.50
Malleable Pig Iron, GT	53.27	53.27	53.27	50.27	28.79
Steelmaking Scrap, GT	43.00	43.00	43.00	41.00	23.58

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Nov. 21 1951	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.45	2.50
Bars, H.R., Chicago	3.70	3.70	3.70	3.45	2.50
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	3.963	2.86
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.15	3.10
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.40	2.35
Shapes, Std., Chicago	3.65	3.65	3.65	3.40	2.35
Shapes, del. Philadelphia	3.918	3.918	3.918	3.46	2.48
Plates, Pittsburgh	3.70	3.70	3.70	3.50	2.50
Plates, Chicago	3.70	3.70	3.70	3.50	2.50
Plates, Coatesville, Pa.	4.15	4.15	4.15	3.90	2.50
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.50	2.50
Plates, Claymont, Del.	4.15	4.15	4.15	3.90	2.50
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.35	2.425
Sheets, H.R., Chicago	3.60	3.60	3.60	3.35	2.425
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Chicago	4.35	4.35	4.35	4.10	3.275
Sheets, C.R., Detroit	4.55	4.55	4.55	4.30	3.41
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.40	4.05
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.50-3.75	2.35
Strip, H.R., Chicago	3.50	3.50	3.50	3.25	2.35
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.15-4.85	3.05
Strip, C.R., Chicago	4.90	4.90	4.90	4.30	3.15
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.35-5.10	3.185
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.50-4.75	3.65
Nails, Wire, Pittsburgh	5.90-6.20	5.90-6.20	5.90-6.20	5.30-5.60	3.75
Tin plate, box, Pittsburgh	$8.70	$8.70	$8.70	$7.50	$5.25

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$63.00	$47.00
Wire rods, ½-⅝", Pitts.	4.10-30	4.10-30	4.10-30	3.85	2.50

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$50.00	$29.00
Basic Valley	52.00	52.00	52.00	49.00	28.00
Basic, del. Phila.	56.61	56.61	56.61	53.39	29.93
No. 2 Fdry, Pitts.	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Chicago	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Valley	52.50	52.50	52.50	49.50	28.50
No. 2 Fdry, Del. Phila.	57.11	57.11	57.11	53.89	30.43
No. 2 Fdry, Birm.	48.88	48.88	48.88	45.88	24.88
No. 2 Fdry (Birm.) del. Cin.	55.49	55.49	55.49	52.58	28.94
Malleable Valley	52.50	52.50	52.50	49.50	28.50
Malleable, Chicago	52.50	52.50	52.50	49.50	28.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	62.00	33.00
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	175.00	140.00*

* Delivered, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pitts.	$44.00	$44.00	$44.00	$44.00	$25.00
No. 1 Heavy Melt, E. Pa.	42.50	42.50	42.50	39.00	22.00
No. 1 Heavy Melt, Chicago	42.50	42.50	42.50	40.00	23.75
No. 1 Heavy Melt, Valley	44.00	44.00	44.00	43.75	25.00
No. 1 Heavy Melt, Cleve.	43.00	43.00	43.00	43.25	24.50
No. 1 Heavy Melt, Buffalo	43.00	43.00	43.00	41.50	24.25
Rails, Rerolling, Chicago	52.50	52.50	52.50	64.50	24.75
No. 1 Cast, Chicago	49.00*	49.00*	49.00*	59.00	30.00*

* F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connlsvl.	$14.75	$14.75	$14.75	$14.25	$8.75
Beehive, Fdry., Connlsvl.	17.50	17.50	17.50	16.50	9.50
Oven Fdry., Chicago	23.00	23.00	23.00	21.00	14.35

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	19.50
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.80	18.80	18.80	16.80	11.65
Tin, New York	103.00	103.00	103.00	137.50	79.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	50.00	42.00	42.00	32.00	23.50
Nickel, refinery, duty paid	56.50	56.50	56.50	48.00	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.	....	59.18	59.68	....
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
AlabamaCity, Ala. R2	48.38	48.88	....	....
Birmingham R2	48.38	48.88	....	....
Birmingham S9	48.38	48.88	....	....
Woodward, Ala. W15	48.38	48.88	....	....
Cincinnati, del.	....	55.49	....	....
Buffalo District				
Buffalo R2	52.00	52.50	53.00	....
Buffalo H1	52.00	52.50	53.00	....
Tonawanda, N.Y. W12	52.00	52.50	53.00	....
No. Tonawanda, N.Y. T9	....	52.50	53.00	....
Boston, del.	62.11	62.61	63.11	....
Rochester, N.Y., del.	54.88	55.38	55.88	....
Syracuse, N.Y., del.	55.91	56.41	56.91	....
Chicago District				
Chicago I-3	52.00	52.50	52.50	53.00
Gary, Ind. U5	52.00	....	52.50	....
IndianaHarbor, Ind. I-2	52.00	....	52.50	....
So. Chicago, Ill. W14	52.00	52.50	52.50	....
So. Chicago, Ill. Y1	52.00	52.50	52.50	....
So. Chicago, Ill. U5	52.00	....	52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.	....	58.47	58.47	....
Cleveland District				
Cleveland A7	52.00	52.50	52.50	53.00
Cleveland R2	52.00	52.50	52.50	....
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O. N3	52.00	....	....	53.00
Duluth, I-3	....	....	52.50	....
Erie, Pa. I-3	52.00	52.50	52.50	53.00
Everett, Mass. E1	....	57.00	57.50	....
Fontana, Calif. K1	58.00	58.50	....	....
Geneva, Utah G1	52.00	52.50	....	....
Seattle, Tacoma, Wash., del.	....	60.66	....	....
Portland, Oreg., del.	....	60.66	....	....
LosAngeles, SanFrancisco, del.	60.16	60.66	....	....
GraniteCity, Ill. G4	53.90	54.40	54.90	....
St. Louis, del. (inc. tax)	54.66	55.16	55.66	....
Ironton, Utah C11	52.00	52.50	....	....
LoneStar, Tex. L6	48.00	*48.50	48.50	....
Minnequa, Colo. C10	54.00	55.00	55.00	....
Pittsburgh District				
NevilleIsland, Pa. P6	....	52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	53.80	53.80	54.30
McKeesRocks, del.	....	53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	54.07	54.07	54.57
Verona, del.	....	54.57	54.57	55.07
Brackenridge, del.	....	54.82	54.82	55.32
Bessemer, Pa. U5	52.00	....	52.50	53.00
Clairton, Rankin, So. Duquesne, Pa. U5	52.00	....	....	....
McKeesport, Pa. N3	52.00	....	....	53.00
Monessen, Pa. P7	54.00	....	....	....
Sharpsville, Pa. S6	....	....	52.50	53.00
Steelton, Pa. B2	54.00	54.50	55.00	55.50
Swedeland, Pa. A3	56.00	56.50	57.00	57.50
Toledo, O. I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97	....	....
Troy, N.Y. R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O. Y1	52.00	52.50	52.50	....
Youngstown Y1	52.00	52.50	52.50	....
Youngstown U5	52.00	....	....	53.00
Mansfield, O., del.	56.65	57.15	57.15	57.65

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$62.50
Buffalo H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

NiagaraFalls, N.Y. P15	$88.00
Keokuk, Iowa, Openhearth & Fdry. frt. allowed K2	92.50
Keokuk, OH & Fdry., 12% lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 3 & 6)

Lyles, Tenn. T3	$66.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa. B2	60.00
Philadelphia delivered	63.37
Troy, N.Y. R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under CCPR as reported to STEEL, Nov. 21, 1951; cents per pound except as otherwise noted. Changes shown in Italics. Code numbers following mill points indicate producing company; key on next two pages

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ....$79.00
Munhall,Pa. U5 ....52.00

INGOTS, Alloy (NT)
Detroit R7 ....$54.00
Fontana,Calif. K1 ....50.00
Houston,Tex. S5 ....62.00
Midland,Pa. C18 ....54.00
Munhall,Pa. U5 ....54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$56.00
Clairton,Pa. U5 ....56.00
Ensley,Ala. T2 ....56.00
Fairfield,Ala. T2 ....56.00
Fontana,Calif. K1 ....75.00
Gary,Ind. U5 ....56.00
Johnstown,Pa. B2 ....56.00
Lackawanna,N.Y. B2 ....56.00
Munhall,Pa. U5 ....56.00
So.Chicago,Ill. U5 ....56.00
So.Duquesne,Pa. U5 ....56.00

Carbon, Forging (NT)
Bessemer, Pa. U5 ....$66.00
Buffalo R2 ....66.00
Canton,O. R2 ....66.00
Clairton,Pa. U5 ....66.00
Cleveland R2 ....66.00
Conshohocken,Pa. A3 ....73.00
Detroit R7 ....69.00
Ensley,Ala. T2 ....66.00
Fairfield,Ala. T2 ....66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. U5 ....66.00
Geneva,Utah G1 ....66.00
Houston,Tex. S5 ....74.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ....66.00
LosAngeles B3 ....85.00
Munhall,Pa. U5 ....66.00
Seattle B3 ....85.00
So.Chicago R2,U5,W14 ....66.00
So.Duquesne,Pa. U5 ....66.00
So.SanFrancisco B3 ....85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$70.00
Buffalo R2 ....70.00
Canton,O. R2 ....70.00
Canton,O.(29) T7 ....66.00
Conshohocken,Pa. A3 ....77.00
Detroit R7 ....73.00
Fontana,Calif. K1 ....89.00
Gary,Ind. U5 ....70.00
Houston,Tex. S5 ....78.00
Ind.Harbor,Ind. Y1 ....70.00
Johnstown,Pa. B2 ....70.00
Lackawanna,N.Y. B2 ....70.00
LosAngeles B3 ....90.00
Massillon,O. R2 ....70.00
Midland,Pa. C18 ....70.00
Munhall,Pa. U5 ....70.00
So.Chicago R2,U5,W14 ....70.00
So.Duquesne,Pa. U5 ....70.00
Struthers,O. Y1 ....70.00
Warren,O. C17 ....70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ....$82.00
Cleveland R2 ....82.00
Fontana,Calif. K1 ....103.00
Gary,Ind. U5 ....82.00
Massillon,O. R2 ....82.00
So.Chicago,Ill. R2 ....82.00
So.Duquesne,Pa. U5 ....82.00

SHEET BARS (NT)
Fontana,Calif. K1 ....$89.00

SKELP
Aliquippa,Pa. J5 ....$3.45
Munhall,Pa. U5 ....3.35
Warren,O. R2 ....3.35
Youngstown R2, U5 ....3.35

WIRE RODS
Alton, Ill. 4.40
AlabamaCity,Ala. R2 ....4.10
Buffalo W12 ....4.10
Cleveland A7 ....4.10
Donora,Pa. A7 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.90
Houston,Tex. S5 ....4.50
Johnstown,Pa. B2 ....4.10
Joliet,Ill. A7 ....4.10
LosAngeles B3 ....4.90
Minnequa,Colo. C10 ....4.35
Monessen,Pa. P7 ....4.30
No.Tonawanda,N.Y. B11 ....4.10
Pittsburg,Calif. C11 ....4.75
Portsmouth,O. P12 ....4.30
Roebling,N.J. R5 ....4.20
So.Chicago,Ill. R2 ....4.10
SparrowsPoint,Md. B2 ....4.20
Sterling,Ill.(1) N15 ....4.10
Struthers,O. Y1 ....4.10
Torrance,Calif. C11 ....4.90
Worcester,Mass. A7 ....4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ....4.45
Lackawanna,N.Y. B2 ....4.45
Munhall,Pa. U5 ....4.45
So.Chicago,Ill. U5 ....4.45

STRUCTURALS
Carbon Steel Stand., Shapes
AlabamaCity,Ala. R2 ....3.60
Aliquippa,Pa. J5 ....3.65
Bessemer,Ala. T2 ....3.65
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fairfield,Ala. T2 ....3.65
Fontana,Calif. K1 ....4.25
Gary,Ind. U5 ....3.65
Geneva,Utah G1 ....3.85
Houston,Tex. S5 ....4.05
Ind.Harbor,Ind. I-2 ....3.65
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.25
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.25
Minnequa,Colo. C10 ....4.10
Munhall,Pa. U5 ....3.65
Niles,Calif.(22) P1 ....4.85
Phoenixville,Pa. P4 ....5.50
Portland,Oreg. O4 ....4.50
Seattle B3 ....4.30
So.Chicago,Ill. U5, W14 ....3.65
So.SanFrancisco B3 ....4.20
Torrance,Calif. C11 ....4.25
Weirton,W.Va. W6 ....3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ....4.25
Fontana,Calif. K1 ....5.55
Munhall,Pa. U5 ....4.35
So.Chicago,Ill. U5 ....4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ....5.50
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa.(14) B2 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.10
Gary,Ind. U5 ....5.50
Geneva,Utah G1 ....5.50
Ind.Harbor,Ind. I-2 ....5.50
Ind.Harbor,Ind. Y-1 ....6.00
Johnstown,Pa. B2 ....5.50
Lackawanna,N.Y.(14) B2 ....5.50
LosAngeles B3 ....6.05
Munhall,Pa. U5 ....5.50
Seattle B3 ....6.10
So.Chicago,Ill. U5 ....5.50
So.SanFrancisco B3 ....6.00
Struthers,O. Y1 ....6.00

Wide Flange
Bethlehem,Pa. B2 ....3.70
Clairton,Pa. U5 ....3.65
Fontana,Calif. K1 ....4.65
Lackawanna,N.Y. B2 ....3.70
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....5.50
Lackawanna,N.Y. B2 ....5.50
Munhall,Pa. U5 ....5.45
So.Chicago,Ill. U5 ....5.45

BEARING PILES
Munhall,Pa. U5 ....3.65
So.Chicago,Ill. U5 ....3.65

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.65
Bessemer,Ala. T2 ....5.65
Clairton,Pa. U5 ....5.65
Cleveland J5, R2 ....5.65
Conshohocken,Pa. A3 ....5.90
Fairfield,Ala. T2 ....5.65
Fontana,Calif.(30) K1 ....6.25
Gary,Ind. U5 ....5.65
Geneva,Utah G1 ....5.65
Ind.Harbor,Ind. I-2 ....5.65
Ind.Harbor,Ind. Y1 ....6.15
Johnstown,Pa. B2 ....5.65
Munhall,Pa. U5 ....5.65
Pittsburgh J5 ....5.65
Seattle B3 ....6.55
Sharon,Pa. S3 ....5.70
So.Chicago,Ill. U5 ....5.65
SparrowsPoint,Md. B2 ....5.65
Warren,O. R2 ....5.65
Youngstown Y1 ....6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ....4.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ....5.05
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....4.75
Johnstown,Pa. B2 ....4.75
Munhall,Pa. U5 ....4.75
Sharon,Pa. S3 ....5.20
So.Chicago,Ill. U5 ....4.75
SparrowsPoint,Md. B2 ....4.75

FLOOR PLATES
Cleveland J5 ....4.75
Conshohocken,Pa. A3 ....4.75
Ind.Harbor,Ind. I-2 ....4.75
Munhall,Pa. U5 ....4.75
So.Chicago,Ill. U5 ....4.75

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ....3.95
Ashland,lcl(15) A10 ....4.45
Cleveland,c.l. R2 ....4.30
Warren,O.c.l. R2 ....4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ....3.70
Aliquippa,Pa. J5 ....3.70
Ashland,Ky. (15) A10 ....3.70
Bessemer,Ala. T2 ....3.70
Clairton,Pa. U5 ....3.70
Claymont,Del. C22 ....4.15
Cleveland J5, R2 ....3.70
Coatesville,Pa. L7 ....4.15
Conshohocken,Pa. A3 ....4.15
Fairfield,Ala. T2 ....3.70
Fontana,Calif. (30) K1 ....4.30
Gary,Ind. U5 ....3.70
GraniteCity,Ill. G4 ....4.40
Geneva,Utah G1 ....3.70
Harrisburg,Pa. C5 ....6.30
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ....3.70
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Minnequa,Colo. C10 ....4.50
Pittsburgh J5 ....3.70
Seattle B3 ....4.60
Sharon,Pa. S3 ....3.95
So.Chicago,Ill. U5, W14 ....3.70
SparrowsPoint,Md. B2 ....3.70
Steubenville,O. W10 ....3.70
Warren,O. R2 ....3.70
Weirton,W.Va. W6 ....4.00
Youngstown R2, U5, Y1 ....3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.45
Geneva,Utah G1 ....4.85

PLATES, Wrought Iron
Economy,Pa. B14 ....8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ....3.70
Aliquippa,Pa. J5 ....3.70
Alton,Ill. L1 ....4.15
Atlanta,Ga. A11 ....4.25
Bessemer,Ala. T2 ....3.70
Buffalo R2 ....3.70
Canton,O. R2 ....3.70
Clairton,Pa. U5 ....3.70
Cleveland R2 ....3.70
Detroit R7 ....3.85
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ....3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Niles,Calif. P1 ....5.05
N.Tonawanda,N.Y. B11 ....3.70
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
Seattle B3, N14 ....4.45
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Weirton,W.Va. W6 ....3.85
So.Chicago R2, U5, W14 ....3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFran.,Cal. B3 ....4.45
Youngstown R2, U5 ....3.70

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....3.70
Atlanta A11 ....4.25
Johnstown,Pa. B2 ....3.70
Lackawanna,N.Y. B2 ....3.70
Niles,Calif. P1 ....5.05
Portland,Oreg. O4 ....4.65
SanFrancisco S7 ....4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 ....3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.30
Buffalo R2 ....4.30
Canton,O. R2 ....4.30
Canton,O.(29) T7 ....3.95
Clairton,Pa. U5 ....4.30
Detroit R7 ....4.45
Ecorse,Mich. G5 ....4.65
Fontana,Calif. K1 ....5.35
Gary,Ind. U5 ....4.30
Houston,Tex. S5 ....4.70
Ind.Harbor,Ind. I-2, Y1 ....4.30
Johnstown,Pa. B2 ....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ....4.30
LosAngeles B3 ....5.35
Massillon,O. R2 ....4.30
Midland,Pa. C18 ....4.30
So.Chicago R2, U5, W14 ....4.30
So.Duquesne,Pa. U5 ....4.30
Struthers,O. Y1 ....4.30
Warren,O. C17 ....4.30
Youngstown U5 ....4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....4.55
Gary,Ind. U5 ....4.55
Youngstown U5 ....4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ....5.55
Bessemer,Ala. T2 ....5.55
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.55
Cleveland R2 ....5.55
Fairfield,Ala. T2 ....5.55
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Ind.Harbor,Ind. I-2 ....5.55
IndianaHarbor,Ind. Y1 ....6.05
Johnstown,Pa. B2 ....5.55
Lackawanna,N.Y. B2 ....5.55
LosAngeles B3 ....6.25
Pittsburgh J5 ....5.55
Seattle B3 ....6.30
So.Duquesne,Pa. U5 ....5.55
So.SanFrancisco B3 ....6.30
Struthers,O. Y1 ....6.05
Youngstown U5 ....5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....4.55
BeaverFalls,Pa. M12, R2 ....4.55
Buffalo B5 ....4.60
Camden,N.J. P13 ....5.00
Carnegie,Pa. C12 ....4.55
Chicago W18 ....4.55
Cleveland A7, C20 ....4.55
Detroit P17 ....4.70
Donora,Pa. A7 ....4.55
Elyria,O. W8 ....4.55
FranklinPark,Ill. N5 ....4.55
Gary,Ind. R2 ....4.55
GreenBay,Wis. F7 ....4.55
Hammond,Ind. L2, M13 ....4.55
Hartford,Conn. R2 ....5.10
Harvey,Ill. B5 ....4.55
LosAngeles R2 ....6.00
Mansfield,Mass. B5 ....5.10
Massillon,O. R2, R8 ....4.55
Monaca,Pa. S17 ....4.55
Pittsburgh J5 ....4.55
Putnam,Conn. W18 ....5.10
Readville,Mass. C14 ....5.10
St.Louis,Mo. M5 ....4.95
So.Chicago,Ill. W14 ....4.55
SpringCity,Pa.(5) K3 ....5.00
Struthers,O. Y1 ....4.55
Waukegan,Ill. A7 ....4.55
Youngstown F3, Y1 ....4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ....5.40
Bethlehem,Pa. B2 ....5.40
Buffalo B5 ....5.40
Camden,N.J. P13 ....5.80
Canton,O. R2 ....5.40
Canton,O.(29) T7 ....4.90
Carnegie,Pa. C12 ....5.40
Chicago W18 ....5.40
Cleveland A7 ....5.45
Cleveland C20 ....5.40
Detroit P17 ....5.55
Donora,Pa. A7 ....5.45
Elyria,O. W8 ....5.40
Gary,Ind. R2 ....5.40
Hammond,Ind. L2, M13 ....5.40
Hartford,Conn. R2 ....5.85
Harvey,Ill. B5 ....5.40
Lackawanna,N.Y. B2 ....5.40
Mansfield,Mass. B5 ....5.85
Massillon,O. R2, R8 ....5.40
Midland,Pa. C18 ....5.40
Monaca,Pa. S17 ....5.40
Newark,N.J. W18 ....5.75
Plymouth,Mich. P5 ....5.60
So.Chicago,Ill. R2, W14 ....5.40
Struthers,O. Y1 ....5.40
Warren,O. C17 ....5.40
Waukegan,Ill. A7 ....5.45
Worcester,Mass. A7 ....5.75
Youngstown F3, Y1 ....5.40

RAIL STEEL BARS
ChicagoHts.(3,4) C2 ....4.75
ChicagoHts.(3,4) I-2 ....4.75
Franklin,Pa. (3,4) F5 ....4.75
FortWorth,Tex.(26) T4 ....4.85
Huntngtn,W.Va.(3) W7 ....5.50
Marion,O.(3) P11 ....4.75
Moline,Ill.(3) R2 ....3.80
Tonawanda (3,4) B12 ....4.75
Williamsport(3) S19 ....5.00
Williamsport(4) S19 ....5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt)U1 ....15.00
Dover,N.J.(Bolt) U1 ....13.50
Dover,(Wrgh.Iron) U1 ....12.25
Economy,Pa. (S.R.) B14 ....9.60
Economy,Pa.(D.R.)B14 ....11.90
Economy,(Staybolt)B14 ....12.20
McK.Rks.(Staybolt) L5 ....14.50
McK.Rks.(S.R.) L5 ....9.60
McK.Rks.(D.R.) L5 ....13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ....3.70
Atlanta A11 ....4.25
Buffalo R2 ....3.70
Cleveland R2 ....3.70
Emeryville,Calif. J7 ....4.45
Fairfield,Ala. T2 ....3.70
Fontana,Calif. K1 ....4.40
Gary,Ind. U5 ....3.70
Houston,Tex. S5 ....4.10
Ind.Harbor,Ind. I-2, Y1 ....3.70
Johnstown,Pa. B2 ....3.70
KansasCity,Mo. S5 ....4.30
Lackawanna,N.Y. B2 ....3.70
LosAngeles B3 ....4.40
Milton,Pa. B6 ....4.20
Minnequa,Colo. C10 ....4.15
Minnesota,Minn. M3 ....4.30
Monessen,Pa. P7 ....4.30
Moline,Ill. R2 ....3.80
Pittsburg,Calif. C11 ....4.40
Pittsburgh J5 ....3.70
Portland,Oreg. O4 ....4.65
SandSprings,Okla. S5 ....4.60
Seattle B3, N14 ....4.45
So.Chicago,Ill. R2 ....3.70
So.Duquesne,Pa. U5 ....3.70
So.SanFrancisco B3 ....4.45
SparrowsPoint,Md. B2 ....3.70
Struthers,O. Y1 ....3.70
Torrance,Calif. C11 ....4.40
Youngstown R2, U5 ....3.70

BARS, Reinforcing
(Fabricated for Consumers)
Huntington,W.Va. W7 ....5.50
Johnstown, ¼-1" B2 ....4.75
LosAngeles B3 ....5.45
Marion,O. P11 ....5.00
Seattle B3, N14 ....5.55
So.SanFrancisco B8 ....5.45
SparrowsPt., ¼-1" B2 ....4.75
Williamsport,Pa. S19 ....5.10

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ....3.60
Ashland,Ky.(8) A10 ....3.60
Butler,Pa. A10 ....3.60
Cleveland J5, R2 ....3.60
Conshohocken,Pa. A3 ....4.00
Detroit M1 ....4.40
Ecorse,Mich.(8) G5 ....3.80
Fairfield,Ala. T2 ....3.60
Fontana,Calif. K1 ....4.55
Gary,Ind. U5 ....3.60
Geneva,Utah G8 ....3.70
GraniteCity,Ill. G4 ....4.60
Ind.Harbor,Ind. I-2, Y1 ....3.60
Irvin,Pa. U5 ....3.60
Lackawanna,N.Y. B2 ....3.60
Munhall,Pa. U5 ....3.60
Niles,O. N12 ....5.25
Pittsburg,Calif. C11 ....4.30
Pittsburgh J5 ....3.60
Sharon,Pa. S3 ....4.00
So.Chicago,Ill. W14 ....3.60
SparrowsPoint,Md. B2 ....3.60
Steubenville,O. W10 ....3.60
Torrance,Calif. C11 ....4.30
Warren,O. R2 ....3.60
Weirton,W.Va. W6 ....3.60
Westmoreland,Pa. A4 ....3.75
Youngstown U5, Y1 ....3.60

SHEETS, H.R., (19 gage)
AlabamaCity,Ala. R2 ....4.75
Dover,N.J. R5 ....5.65
Ind.Harbor,Ind. I-2 ....5.40
Mansfield,O. E6 ....5.65
Niles,O. N12 ....5.75
Torrance,Calif. C11 ....5.40

SHEETS, H.R., (14-ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ....5.40
Conshohocken,Pa. A3 ....5.65
Ecorse,Mich. G5 ....5.95
Fairfield,Ala. T2 ....5.40
Fontana,Calif. K1 ....6.35
Gary,Ind. U5 ....5.40
Ind.Harbor,Ind. I-2 ....5.40
IndianaHarbor,Ind. Y1 ....5.90
Irvin,Pa. U5 ....5.40
Lackawanna(35) B2 ....5.40
Pittsburgh J5 ....5.40
Sharon,Pa. S3 ....5.40
So.Chicago,Ill. U5 ....5.40
SparrowsPoint (36) B2 ....5.40
Warren,O. R2 ....5.40
Weirton,W.Va. W6 ....5.75
Youngstown U5 ....5.40
Youngstown Y1 ....5.90

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ....6.55
Ecorse,Mich. G5 ....7.10
Fontana,Calif. K1 ....7.50
Gary,Ind. U5 ....6.55
IndianaHarbor,Ind. Y1 ....7.05
IndianaHarbor,Ind. I-2 ....6.55
Irvin,Pa. U5 ....6.55
Lackawanna(37) B2 ....6.55
Pittsburgh J5 ....6.55
SparrowsPoint(38) B2 ....6.55
Warren,O. R2 ....6.55
Weirton,W.Va. W6 ....6.90
Youngstown Y1 ....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.55
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	4.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.05
Ind.Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.80
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Well Casing

Fontana,Calif. K1	5.10
Torrance,Calif. C11	5.10

BLUED Stock, 29 ga.

Yorkville,O. W10	6.80
Follansbee,W.Va.(23) F4	6.85

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind.Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind.Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Cal. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16 Pure Iron

	Cu	Cu
	Alloy	Fe
Ashland,Ky. A10	5.60	...
Canton,O. R2	5.85	6.10
Fairfield,Ala. T2	5.60	5.85
Gary U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	...
MartinsFy.O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	...
SparrowsPt. B2	5.60	...
Torrance,Cal. C11	6.35	...

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind.Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TIN PLATE, Electrolytic (Base Box)

	0.25-lb	0.50 lb	0.75lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind.Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut-lengths)	...	...	7.25	8.50	9.30
Brackenridge,Pa. A4	...	...	7.75	9.00	9.80
GraniteCity,Ill.G4 (cut lengths)	...	...	7.95	9.20	...
Ind.Harbor,Ind. I-2	6.95	7.25	(34)	...	...
Mansfield O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)	...	6.75	7.25	...	...
Vandergrift,Pa. U5	...	7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10	...	7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower) Transformer Grade

	72	65	58	52
BeechBottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35	...	...	...
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35	...	...	...
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	...	...	14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.,Cal. C11	9.20	9.45
Sp.Pt.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
IndianaHarbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. G6	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	7.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt,Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	4.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32) B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.00
Minnequa,Colo. C10	4.55
New Britain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgprt,Conn.(10) S15	5.45
Carnegie,Pa. S18	5.85
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.35	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol Conn. W1	...	...	7.70	9.65	...
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7, K1	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. G6	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn. Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	...
NewCastle,Pa. E5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	...
NewYork W3	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. N8; Cleve.orPitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. N7	4.85	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton,N.J. R5	...	...	10.30	12.50	15.35
Harrison,N.J. C18	...	...	10.30	12.50	15.35
NewYork W3	...	...	10.30	12.50	15.35

STRIP, Hot-Rolled Carbon

Midland,Pa. C18	5.85
NewBritn.Conn.(10) S15	5.45
Sharon,Pa. S3	5.85
Youngstown U5	5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa. E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Brewster Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)	S15 10.75
Carnegie,Pa.	S18 ....10.60
Cleveland	A7 .....10.00
Dover,O.	G6 .....10.50
Fontana,Calif.	K1 ....11.65
Harrison,N.J.	C18 ....10.60
Midland,Pa.	C18 ....10.60
NewBrtn,Conn.(10)	S15 10.75
Pawtucket,R.I.(11)	N8 10.75
Pawtucket,R.I.(12)	N8 11.05
Sharon,Pa.	S3 .....10.60
Worcester,Mass.	A7 ..10.30
Youngstown	C8 .....10.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky. (8)	A10 ..3.75
Warren,O.	R2 .....4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O.	R2 .....5.25

TIGHT COOPERAGE HOOP

Atlanta	A11 .....4.05
Riverdale,Ill.	A1 .....3.90
Sharon,Pa.	S3 .....4.15
Youngstown	U5 .....3.75

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity	R2	5.70 5.95
Aliquippa	J5	5.70 6.15
Atlanta	A11	5.95 6.40
Bartonville(19)	K4	5.70 6.15
Buffalo	W12	4.85 ....
Cleveland	A7	5.70 6.15
Crawfordsville	M8	5.95 6.40
Donora,Pa.	A7 ..	5.70 6.15
Duluth,Minn.	A7 ..	5.70 6.15
Fairfield	T2	5.70 6.15
Houston,Tex.	S5 ..	6.10 6.55
Johnstown	B2 ..	5.70 6.15
Joliet,Ill.	A7 ..	5.70 6.15
KansasCy,Mo.	S5 ..	6.30 6.75
Kokomo	C16 ..	5.80 6.05
LosAngeles	B3 ..	6.65 ....
Minnequa	C10	5.95 6.45
Monessen	P7	5.95 6.40
Palmer	W12	5.15 ....
Pitts.,Calif.	C11 ..	6.65 6.80
Prtsmth.(18)	P12 ..	6.10 6.60
Rankin	A7	5.70 6.15
So.Chicago	R2 ..	5.70 5.95
So.S.Fran.	C10 ..	6.65 7.10
SparrowsPt.	B2 ..	5.80 6.25
Sterling,Ill.(1)	N15	5.70 6.15
Struthers,O.	Y1 ..	5.70 6.15
Torrance,Cal.	C11	6.65 ....
Worcester	A7	6.00 6.45

ROPE WIRE	(A)	(B)
Alton,Ill.	L1	8.65 8.90
Bartonville,Ill.	K4	8.55 8.80
Buffalo	W12	8.55 8.80
Fostoria,O.	S1 ..	8.85 9.10
Johnstown,Pa.	B2	8.55 8.80
Monessen,Pa.	P16	8.55 8.80
Monessen,Pa.	P7 ..	8.95 9.05
Palmer,Mass.	W12	8.85 9.10
Portsmouth,O.	P12	8.55 8.80
Roebling,N.J.	R5 ..	8.85 9.10
SparrowsPt.	B2 ..	8.65 8.90
Struthers,O.	Y1 ..	8.55 8.80
Worcester J4, T6.		8.85 9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala.	R2 ...4.85
Aliquippa,Pa.	J5 .....4.85
Atlanta	A11 .....5.10
Alton,Ill.	L1 .....5.05
Bartonville,Ill.(1)	K4 ..4.85
Buffalo	W12 .....4.85
Chicago	W13 .....5.10
Cleveland	A7, C20 ....4.85
Crawfordsville,Ind.	M8..5.10
Donora,Pa.	A7 .....4.85
Duluth,Pa.	A7 .....4.85
Fairfield,Ala.	T2 .....4.85
Fostoria,O.(24)	S1 ....5.35
Houston	S5 .....5.25
Johnstown,Pa.	B2 .....4.85
Joliet,Ill.	A7 .....4.85
KansasCity,Mo.	S5 ....5.45
Kokomo,Ind.	C16 .....4.95
LosAngeles	B3 .....5.80
Minnequa,Colo.	C10 ....5.10
Monessen,Pa.	P7 .....5.10
Newark,	6-8 ga. I-1 ..5.50
No.Tonawanda	B11 ...4.85
Palmer,Mass.	W12 ...5.15
Pittsburg,Calif.	C11 ...5.80
Portsmouth,O.	P12 ....5.25
Rankin,Pa.	A7 .....4.85
So.Chicago,Ill.	R2 .....4.85
So.SanFrancisco	C10....5.80
SparrowsPoint,Md.	B2..4.95
Sterling,Ill.(1)	N15 ....4.85
Struthers,O.	Y1 .....4.85
Torrance,Calif.	C11 ....5.80
Waukegan,Ill.	A7 .....4.85
Worcester,Mass.	A7, T6 5.15

WIRE, Cold-Rolled Flat

Anderson,Ind.	G6 ....6.20
Buffalo	W12 .....6.35
Cleveland	A7 .....5.85
Crawfordsville,Ind.	M8..6.20
Detroit	D2 .....6.20
Dover,O.	G6 .....6.20
Fostoria,O.	S1 .....6.00
Kokomo,Ind.	C16 .....5.70
FranklinPark,Ill.	T6 ...6.20
Massillon,O.	R8 .....5.85
Monessen,Pa.	P16 ....5.85
Monessen,Pa.	P7 .....6.10
NewHaven,Conn.	D2 ....6.50
Pawtucket,R.I.(12)	N8..6.85
Trenton,N.J.	R5 .....6.15
Worcester	A7 .....6.15
Worcester	T6 .....6.50
Worcester	W12 .....6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill.	K4 ....8.50
Monessen,Pa.	P16 .....8.50
Roebling,N.J.	R5 .....8.80
SparrowsPoint,Md.	B2 ..8.60
Johnstown,Pa.	B2 .....8.50

WIRE, Tire Bead

Bartonville,Ill.(1)	K4..10.90
Monessen,Pa.	P16 .....11.40
Roebling,N.J.	R5 .....11.55

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa	J5 ....10.15	12.15
Bartonville(1)	K4 10.25	11.95
Cleveland	A7 ...10.25	12.15
Crawfrdsville	M8..10.30	12.00
Fostoria,O.	S1 ...10.40	13.90
Johnstown	B2 ...10.25	12.15
Kokomo	C16 ....10.25	11.95
Minnequa	C10 ....10.40	12.40
Palmer,Mass.	W12..10.25	12.15
Pitts.Cal.	C11 ...10.60	12.50
Prtsmth.(18)	P12..10.55	12.30
SparrowsPt.	B2...10.35	12.25
Waukegan	A7 ...10.25	12.15

WIRE, MB Spring, High Carbon

Aliquippa,Pa.	J5 .....6.25
Alton,Ill.	L1 .....6.45
Bartonville,Ill.(1)	K4 ..6.25
Buffalo	W12 .....6.25
Cleveland	A7 .....6.25
Donora,Pa.	A7 .....6.25
Duluth	A7 .....6.25
Fostoria,O.	S1 .....6.25
Johnstown,Pa.	B2 .....6.25
LosAngeles	B3 .....7.20
Milbury,Mass.(12)	N6 ..6.85
Monessen,Pa.	P7, P16 ..6.25
Palmer,Mass.	W12 ....6.55
Pittsburg,Calif.	C11 ...7.20
Roebling,N.J.	R5 .....6.55
Portsmouth,O.	P12 .....6.25
So.Chicago,Ill.	R2 .....6.25
So.SanFrancisco	C10 ...7.20
SparrowsPoint,Md.	B2 ..6.35
Struthers,O.	Y1 .....6.25
Trenton,N.J.	A7 .....6.55
Waukegan,Ill.	A7 .....6.25
Worcester A7, T6, W12	6.55
Worcester,Mass.	J4 ...6.75

WIRE, Fine & Weaving(8" Coils)

Bartonville,Ill.(1)	K4 ..8.90
Buffalo	W12 .....8.90
Chicago	W13 .....8.90
Cleveland	A7 .....8.90
Crawfordsville,Ind.	M8..8.95
Fostoria,O.	S1 .....8.90
Johnstown,Pa.	B2 .....8.90
Kokomo,Ind.	C16 ....8.90
Monessen,Pa.	P16 ....8.90
Palmer,Mass.	W12 ....9.20
Portsmouth,O.	P12 ....8.90
Roebling,N.J.	R5 .....9.25
Waukegan,Ill.	A7 .....8.90
Worcester,Mass.	A7 T6 9.20

WIRE, Barbed	Col.
AlabamaCity,Ala.	R2 136
Aliquippa,Pa.	J5 140
Atlanta	A11 143
Bartonville,Ill.(19)	K4 ..143
Crawfordsville,Ind.	M8 ..145
Donora,Pa.	A7 140
Duluth,Minn.	A7 140
Fairfield,Ala.	T2 140
Houston,Tex.	S5 148
Johnstown,Pa.	B2 140
Joliet,Ill.	A7 140
KansasCity,Mo.	S5 152
Kokomo,Ind.	C16 142
Minnequa,Colo.	C10 146
Monessen,Pa.	P7 145
Pittsburg,Calif.	C11 160
Portsmouth,O.(18)	P12..147
Rankin,Pa.	A7 140
So.Chicago,Ill.	R2 136
So.SanFran.,Calif.	C10 ..160
SparrowsPoint,Md.	B2 ..142
Sterling,Ill.(1)	N15 140

BALE TIES, Single Loop	Col.
AlabamaCity,Ala.	R2 ...123
Atlanta	A11 126
Bartonville,Ill.(19)	K4 ..123
Crawfordsville,Ind.	M8 ..132
Donora,Pa.	A7 123
Duluth,Minn.	A7 123
Fairfield,Ala.	T2 123
Joliet,Ill.	A7 123
KansasCity,Mo.	S5 135
Kokomo,Ind.	C16 125
Minnequa,Colo.	C10 128
Pittsburg,Calif.	C11 147
So.Chicago,Ill.	R2 123
So.SanFran.,Calif.	C10 ..147
SparrowsPoint,Md.	B2 ..125
Sterling,Ill.(1)	N15 123

WIRE, Upholstery Spring

Aliquippa,Pa.	J5 .....5.90
Alton,Ill.	L1 .....6.10
Buffalo	W12 .....5.90
Cleveland	A7 .....5.90
Donora,Pa.	A7 .....5.90
Duluth,Minn.	A7 .....5.90
Johnstown,Pa.	B2 .....5.90
LosAngeles	B3 .....6.85
Monessen,Pa.	P7, P16 ..5.90
NewHaven,Conn.	A7 ...6.20
Palmer,Mass.	W12 ....6.20
Pittsburg,Calif.	C11 ...6.85
Portsmouth,O.	P12 ....5.90
So.SanFrancisco	C10 ...6.85
SparrowsPoint,Md.	B2 ..6.00
Torrance,Calif.	C11 ...6.85
Trenton,N.J.	A7 .....6.20
Waukegan,Ill.	A7 .....5.90
Worcester,Mass.	A7 .....6.20

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala.	R2 ..126
Ala.City,Ala.	17-18ga.R2 213
Aliquippa,Pa.	9-14½ga.J5 130
Atlanta	A11 133
Bartonville,Ill.(19)	K4 ..130
Crawfordsville,Ind.	M8 ..132
Donora,Pa.	A7 130
Duluth,Minn.	A7 130
Fairfield,Ala.	T2 130
Houston,Tex.	S5 138
Johnstown,Pa.	B2 130
Johnstown,17ga.,6"	B2 ..204
Johnstown,17ga.,4"	B2 ..207
Joliet,Ill.	A7 130
KansasCity,Mo.	S5 142
Kokomo,Ind.	C16 132
Minnequa,Colo.	C10 138
Monessen,Pa.	P7 135
Pittsburg,Calif.	C11 153
Portsmouth,O.(18)	P12 ..137
Rankin,Pa.	A7 130
So.Chicago,Ill.	R2 126
Sterling,Ill.(1)	N15 130

FENCE POSTS

ChicagoHts.,Ill.	C2 140
Duluth,Minn.	A7 125
Franklin,Pa.	F5 140
Huntington,W.Va.	W7 ...140
Johnstown,Pa.	B2 140
Marion,O.	P11 140
Minnequa,Colo.	C10 130
Moline,Ill.	R2 136
So.Chicago	R2 140
Tonawanda,N.Y.	B12 ...140
Williamsport,Pa.	S19 130

TRACK BOLTS (20) Treated

KansasCity,Mo.	S5 .....9.85
Lebanon,Pa.	(22) B2 ..9.85
Minnequa,Colo.	C10 ....9.85
Pittsburgh	O3, P14 ..9.85
Seattle	B3 .....10.35

NAILS & STAPLES, Stock To dealers & mfrs. (2)

	Col.
AlabamaCity,Ala.	R2 ..118
Aliquippa,Pa.(13)	J5 118
Atlanta	A11 121
Bartonville,Ill.(19)	K4 ..118
Chicago,Ill.	W13 118
Cleveland	A9 125
Crawfordsville,Ind.	M8 ..122
Donora,Pa.	A7 118
Duluth,Minn.	A7 118
Fairfield,Ala.	T2 118
Galveston,Tex.	D7 126
Houston,Tex.	S5 126
Johnstown,Pa.	B2 118
Joliet,Ill.	A7 118
KansasCity,Mo.	S5 120
Kokomo,Ind.	C16 120
Minnequa,Colo.	C10 123
Monessen,Pa.	P7 124
Pittsburg,Calif.	C11 137
Portsmouth,O.	P12 124
Rankin,Pa.	A7 118
So.Chicago,Ill.	R2 118
SparrowsPoint,Md.	B2 ..120
Sterling,Ill.(1)	N15 118
Torrance,Calif.	C11 138
Worcester,Mass.	A7 124

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa.	A3 .$7.35
Wheeling,W.Va.	W10 ..7.35

TIE PLATES

Fairfield,Ala.	T2 .....4.50
Gary,Ind.	U5 .....4.50
Ind.Harbor,Ind.	I-2 ....4.50
Lackawanna,N.Y.	B2 ....4.50
Minnequa,Colo.	C10 ....4.50
Pittsburg,Calif.	C11 ....4.65
Seattle	B3 .....4.65
Steelton,Pa.	B2 .....4.50
Torrance,Calif.	C11 ....4.65

JOINT BARS

Bessemer,Pa.	U5 .....4.70
Fairfield,Ala.	T2 .....4.70
Ind.Harbor,Ind.	I-2 ....4.70
Joliet,Ill.	A7 .....4.70
Lackawanna,N.Y.	B2 ....4.70
Minnequa,Colo.	C10 ....4.70
Steelton,Pa.	B2 .....4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind.	I-2, Y1..6.15
KansasCity,Mo.	S5 .....6.40
Lebanon,Pa.	B2 .....6.15
Minnequa,Colo.	C10 ....6.15
Pittsburgh	J5 .....6.15
Seattle	B3 .....6.65
So.Chicago,Ill.	R2 .....6.15
Struthers,O.	Y1 .....6.15
Youngstown	R2 .....6.15

AXLES

Ind.Harbor,Ind.	S18 ....5.60
Johnstown,Pa.	B2 .....5.60

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa.	3.60	3.50	3.55	4.00
Ensley,Ala.	3.60	3.50	...	4.00
Fairfield,Ala.	...	...	...	4.00
Gary,Ind.	3.60	3.50	3.55	...
Huntington,W.Va.	...	...	...	5.00
Ind. Harbor,Ind.	3.60	3.50	3.55	...
Johnstown,Pa.	...	...	....(16)	4.00
Lackawanna	3.60	3.50	...	4.00
Minnequa,Colo.	3.60	3.50	...	4.50
Steelton,Pa.	3.60	3.50	...	...
Williamsport,Pa.	...	...	...	4.75

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1	....	1.505
18	4	2	....	1.650
20-25	4.25	1.6	12-25	3.535-3.675
19	4	2	7	2.460
18-25	4.25	1	4.75	2.125
18	4	2	9	2.445-2.45
13.5	4	3	....	1.6025

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2, and V3.

Footnotes:

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia dcf.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.50c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 48 lb and under.
(17) Plats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 25c ext for untreated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) 28 Ga. 36" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Del. or spot, edge.
(33) To jobbers, deduct 20c.
(34) 7.25c for cut lengths.
(35) 12" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

Key to Producers

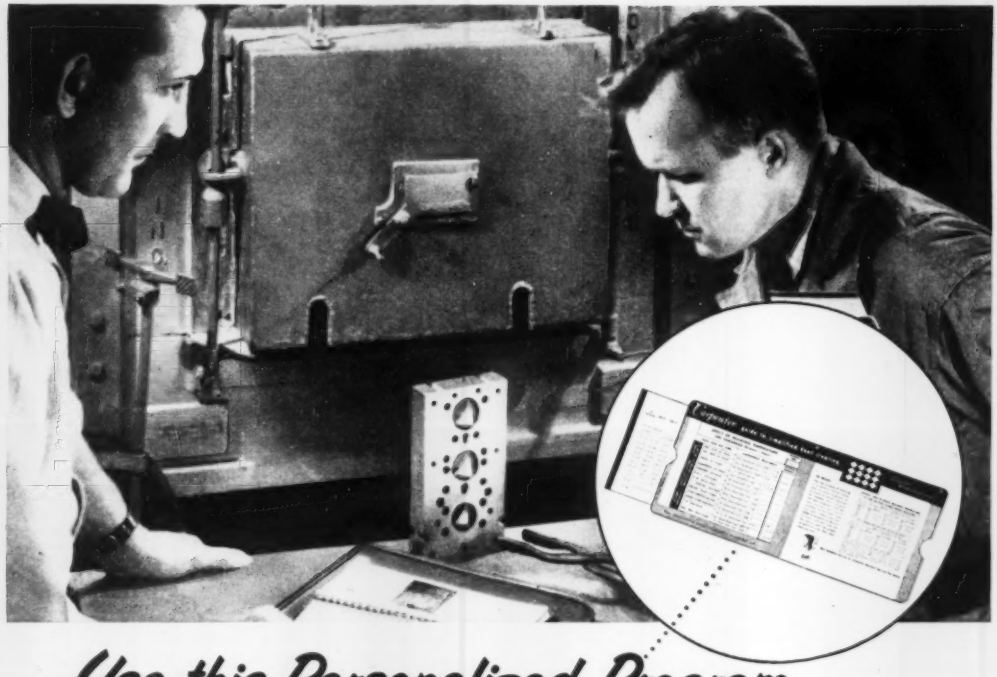
M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb.,Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellianceDiv.,Eaton Mfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 YoungstownSheet&Tube

WHEREVER TOOL STEELS ARE APPLIED...



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Here's a program, brought right to your shop door, that can produce tooling results that will honestly surprise you.

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STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	...	+0.5	+2.5	...
¼	6.0	0.42	28.5	26.5	...	+3.5	+5.5	...
⅜	6.0	0.57	23.5	21.5	...	+10.0	+12.0	...
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.13	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	44.0	41.0	20.5	22.5	19.5
1½	27.5	2.78	42.5	41.5	41.5	21.5	20.0	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 3½ points lower on ⅛", 1½ points lower on ¼", and 2 points lower on ⅜", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜". Wheatland, Pa. W9, 2 points lower on ⅛", ¼", ⅜"; Following make ½" and larger: Lorain, O., N3; Youngstown R2 and 36¼% on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. I-6, ⅛-⅜", Benwood, W. Va. W10, except plus 5½% on ⅛", plus 5% on ¼", plus 12½ on ⅜"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ¼", ⅜", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ½", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½", 3". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½% on 3½" and 4"; Youngstown Y1. Aliquippa, Pa. J5 quotes 1 point lower on ⅜", 2 points lower on 1", 1½ points lower on 1¼", 2 points lower on 1½" and 2", 1½ points lower on 2½" and 3"; Etna, Pa. N2 and 17½% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.66	29.5	8.0	29.5	8.0
2½	54.5	5.82	32.5	11.5	32.5	11.5
3	74.5	7.62	32.5	11.5	32.5	11.5
3½	93.0	9.29	34.5	13.5	34.5	13.5
4	$1.09	10.80	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mil; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	16.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.28	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2¼	12	26.92	32.97	26.86	31.76
2½	12	29.66	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Strip—Cold-Rolled Carbon Base Both Sides 10%	Sheets—Carbon Base 10%	Sheets—Carbon Base 20%	Cu Base Both Sides
302 ..	....	....	....	19.75	24.24–27.50	77.00
304 ..	25.00	29.50	....	24.50	27.50–27.77	77.00
309 ..	30.50	35.00	....	....	....	....
310 ..	36.50	41.00	....	....	....	144.00
316 ..	29.50	34.00	....	26.00	35.92–38.50	....
317 ..	34.50	38.00	....	....	....	....
318 ..	33.50	38.00	....	....	....	....
321 ..	26.50	31.00–32.00	....	23.00	33.00	111.00
347 ..	27.50	32.00	....	24.00	33.50–33.83	130.00
405 ..	21.25	27.75	....	....	....	....
410 ..	20.75	27.25	....	....	....	....
Nickel .	33.50	45.15	41.00	54.00	....	....
Inconel.	41.23	54.13	....	....	....	165.00
Monel .	34.93	46.23	....	....	....	....
Copper*	....	....	23.70†	29.65‡	....	....

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	15
⅝-in. & ⅞-in.	18.5
1-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter ..	23
over 6 in. long ...	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up bolts	31

NUTS

	Reg.	Hvy.
H.P. & C.P. Square:		
½-in. & smaller	15	15
⅝-in. & ⅞-in.	12	6.5
1-in.-1⅛-in.	9	1
1⅛-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	16.5	6.5
1-in.-1⅛-in.	12	2
1⅛-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
⅝-in. & ⅞-in.	23	17.5
1-in. & 1⅛-in.	19.5	12
1⅛-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅞-in.	29.5	22
1-in.-1⅛-in.	24	15
1⅛-in. & larger	13	8.5
		Light
½-in. & smaller	.....	35
⅝-in. to ⅞-in.	.....	28.5
1-in. to 1½-in.	.....	26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ..... 48 & 10
Plated finishes .... 31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
½-in. & smaller	42
⅝-in. through 1 in. .	34
Longer than 6 in.:	
½-in. & smaller ...	26
⅝-in. through 1 in. .	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller....	35
¼-in. diam. & larger .	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c
½-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Diam.	Inches	Cents per lb
17-18-20	60-72	17.86
8 to 16	48-60-72	17.85
7	48-60	19.57
6	48-60	20.95

CARBON

35-40	110	8.03
30	65-84-110	8.03
24	72 to 104	8.03
17 to 20	34-90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	41.00	34.00	31.25
302...	41.25	36.75	31.50
303...	43.25	40.25	34.00
304...	43.25	38.75	33.00
309...	56.00	55.00	44.75
316...	57.00	59.00	49.25
321...	49.25	48.25	37.00
347...	53.75	52.25	41.50
410...	36.50	30.50	25.75
416...	37.00	37.00	26.25
420...	44.00	47.00	31.25
430...	39.00	31.00	26.25
501...	27.50	26.00	14.25
502...	28.50	27.00	15.25

Balt., Types 301-347 sheet, quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, except 303 and 309 E2.

Brackenridge, Pa., Sheets A4 sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 and 0.25c lower on Types 302, 304, 321, 347; 0.50c lower on Types 309 and 316 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U6.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip, except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00
Toluol, one deg... 26.00-33.00
Industrial xylol .. 25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia .$32-$45

Cents per pound, ovens

Phenol, 40 (carlots, non-returnable drums) ..17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron	Cents
98+% Fe, carlots..	17.00
Swedish, c.l. New York, in bags	.8.85-9.95
Electrolytic Iron:	
Annealed, 99.5% Fe.	42.50
Unannealed, 99 + % Fe	38.50
Unannealed, 99 + % Fe (minus 325 mesh)	58.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns ..	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	33.50
Antimony	75.85
Brass, 10-ton lots.	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 10 ton lots	50.00
Copper:	
Electrolytic	37.25-46.25
Reduced	33.75-37.00
Lead	25.50
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed ...	86.00
Nickel-Silver, 10-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302 ..	83.00
Zinc, 10-ton lots.	23.00-30.50

Tungsten	Dollars
Melting grade, 99%, 60 to 200 mesh, freight allowed:	
1000 lb and over ..	6.00
Less than 1000 lb ..	6.15
98.8% minus 65 mesh, freight allowed:	
1000 lb and over ...	4.15
Less than 1000 lb ..	4.25
Molybdenum:	
99.9%, minus 200 mesh	3.25
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvil, fur.	.$14.50-15.00
Connelsvil, fdry.	.17.00-18.00
New River foundry	...21.30
Wise county, foundry	...15.95
Wise county, furnace	...15.20

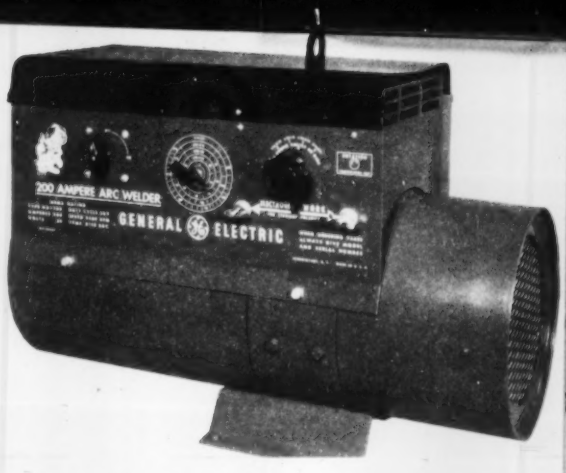
OVEN FOUNDRY COKE

Kearny, N. J., ovens..	$22.75
Everett, Mass., ovens, New England, del...	*24.80
Chicago ovens.....	23.00
Chicago, del	24.50
Terre Haute, ovens ...	22.50
Milwaukee, ovens	23.75
Indianapolis, ovens	22.75
Chicago, del.	26.42
Cincinnati, del.	25.85
Detroit, del	26.85
Ironton, O., ovens	22.50
Cincinnati, del.	25.12
Painesville, O., ovens..	24.00
Cleveland, del.	25.82
Erie, Pa., ovens	23.50
Birmingham, ovens	20.30
Birmingham, del. ...	21.60
Philadelphia, ovens	22.70
Nevillelsland, Pa., ovens	23.00
Swedeland, Pa., ovens..	22.60
St. Louis, ovens St. Louis, del	25.40
Portsmouth, O., ovens.	22.50
Cincinnati, del	25.12
Detroit, ovens	24.00
Detroit, del.	25.00
Buffalo, del.	26.89
Flint, del.	26.59
Pontiac, del.	25.47
Saginaw, del.	26.92

* Or within $4.15 freight zone from works.

New

New WD-4200 and smaller WD-4150 are compact, portable welders with wide current range and versatility of operation. 30 volts, 50% duty cycle 220 440 volts; 60 cycles; 150 and 200 amps.



D-C WELDER

Features Versatility and Ease of Operation, High Production, Low Costs

VERSATILE

The new G-E WD-4200 can be used with:

- a variety of electrodes from $\frac{1}{16}$ to $\frac{3}{8}$ inches, and as large as $\frac{1}{4}$ in. for special short jobs
- wide current range from 30 to 250 amps, or as low as 15 amps with a special, easily-installed resistor
- both Inert-Arc and metal-arc welding

EASY TO OPERATE

Operators like the new manual starter, simple dial controls and a stable arc which can be maintained at any current setting. The compact, lightweight WD-4200 is easily portable, too.

INCREASES PRODUCTION

High instantaneous voltage makes the arc strike every time on heavy or light-gage stock, reducing spoilage.

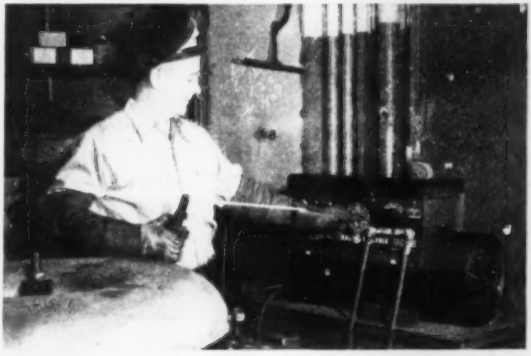
The WD-4200 is suited to both fast metal-arc welding and Inert-Arc welding of copper, stainless steel and alloy steels, including sheet metal from $\frac{1}{32}$ to $\frac{1}{8}$ inches.

LOWERS COSTS

Reduces Power Costs 10 to 15%

The WD-4200 substantially lowers costs because the full range of current is obtained without the use of a current-limiting resistor.

Limited current peaks conserve electrodes and help prevent spatter and burn-through. You save on original cost, production *and* upkeep expense!



It's easy to select *just the right* current (above photo.) The operator can use a wide variety of electrodes for either Inert-Arc or metal-arc welding.

GENERAL ELECTRIC

Section A 711-19
General Electric Company
Schenectady 5, N. Y.

Please send me your bulletin, GEC-847, which describes the newest G-E WD4200 Generator Welder.

Bulletin needed for:
Reference purposes
Planning immediate project

Name .....
(Please print)
Position .....
Address .....
City ..... Zone ..... State .....

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	6.27	7.29	8.44	6.59	...	6.42	7.29	9.25	6.40	6.58	8.04
New York(c'try)	5.97	6.99	8.14	6.29	...	6.12	6.99	8.95	6.10	6.28	7.74
Boston (city)	6.40	7.20	8.49	6.35	...	6.25	7.04	9.25	6.40	6.98	7.88
Boston (c'try)	6.20	7.00	8.29	6.15	...	6.05	6.84	9.05	6.20	6.78	7.68
Phila. (city)	6.15	7.05	8.25	6.35	...	6.30	7.11	8.90	6.15	6.30	7.40
Phila. (c'try)	5.90	6.80	8.00	6.10	...	6.05	6.86	8.65	5.90	6.05	7.15
Balt. (city)	5.80	7.04	8.27	6.24	...	6.24	7.09	...	6.34	6.00	7.64
Balt. (c'try)	5.60	6.84	8.07	6.04	...	6.04	6.89	...	6.14	5.80	7.44
Norfolk, Va.	6.50	...	...	6.70	...	6.55	7.70	...	6.60	6.50	8.00
Richmond, Va.	5.90	...	8.10	6.10	...	6.10	6.90	...	6.30	6.05	7.80
Wash. (w'hse)	6.02	7.26	8.49	6.46	...	6.46	7.26	...	6.56	6.22	7.86
Buffalo (del.)	5.80	6.60	8.29	6.06	...	5.80	6.65	10.65††‖	6.00	6.25	7.55
Buffalo (w'hse)	5.60	6.40	8.09	5.86	...	5.60	6.45	10.45††‖	5.80	6.05	7.35
Pitts. (w'hse)	5.60	6.40*	7.75	5.65-5.95	6.90	5.55	6.40	10.10††	5.70	5.75	7.00
Detroit (w'hse)	5.45-5.78	6.53-6.80	7.99	5.94-5.95	7.75	5.84	6.56	8.91	6.09	6.19-6.35	7.28
Cleveland (del.)	5.80	6.60	8.30	5.89	7.10	5.77	6.60-6.70	8.91	10.02	6.12	7.82
Cleve. (w'hse)	5.60	6.40	8.10	5.69	6.90	5.57	6.40-6.50	8.71	5.82	5.92	7.12
Cincin. (city)	6.02	6.59	7.34	5.95	...	5.95	6.51	...	6.24	6.34	7.50
Chicago (city)	5.80	6.60	7.95	5.75	...	5.75	6.50	10.30	5.90	6.00	7.20
Chicago (w'hse)	5.60	6.40	7.75	5.55	...	5.55	6.30	10.10	5.70	5.80	7.00
Milwau. (city)	5.94	6.74	8.09	5.89	...	5.89	6.74	10.44	6.04	6.14	7.34
Milwau. (c'try)	5.74	6.54	7.89	5.69	...	5.69	6.54	10.24	5.84	5.94	7.14
St. Louis (del.)	6.05	6.85	8.20	6.00	...	6.00	6.85	10.55	6.23	6.33	7.53
St. L. (w'hse)	5.85	6.65	8.00	5.80	...	5.80	6.65	10.35	6.03	6.13	7.33
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
KansCity(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90‡	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75‡	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.55	8.10	9.05‡	6.60	8.90	6.55	7.75	...	6.55	6.60	9.20
L. A. (w'hse)	6.35	7.90	8.85‡	6.40	8.70	6.35	7.55	...	6.35	6.40	8.70
Seattle-Tacoma	6.65	7.80‡	8.90‡	6.60	...	6.45	8.20	...	6.45	6.50	8.60
San Francisco	7.05	8.60‡	9.20‡	7.30	...	6.75	9.10	11.15	6.65	6.75	8.80

Prices do not includes gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; ‖ as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; *—500 to 1499 lb; ‡—450 to 1499 lb; §—3500 lb and over; ‖—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit, del. E Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematities	17.00
Brazilian iron ore, 68-69%	24.00-25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 79.8-81.6c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential, for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $75, Palmerton, Pa.; $75, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed, $197; gross ton lots, packed, $212; less gross ton lots, packed, $229; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Ashtabula, O. Base price: $187, Johnstown, Pa.; $188, Sheridan, Pa.; $188, Etna, Pa.; $190, Chattanooga, Tenn; $186, Anaconda, Mont.

Shipment from Pacific Coast warehouses by one seller, add $33 to above prices f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244; f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c, ton lots 27.6c, less ton 28.5c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max, 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.). Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload, lump, bulk, 34c per lb of metal; packed, 34.75c; ton lot 36.25c; less ton lot 38.25c. Delivered. Spot, add 2c.

Manganese Electrolytic: 40,000 lb or more, 28c; 2000 to 39,999 lb, 30c; 250 to 1999 lb, 32c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si 9.90c per lb of alloy, carload packed, 10.65c, ton lot 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $4.80 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 8-8%, Zr, 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ⅛" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth $1.14, packed in bags containing 20 lb of molybdenum; Washington, Pa., $1.13.

NOTE: Curent prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 151, Nov. 12 issue; calcium, zirconium and briquetted alloys, page 171, Nov. 19. Refractories prices also were published on page 171, Nov. 19 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Oct. 23, 1951

STEELMAKING SCRAP COMPOSITE

Nov. 21	$43.00
Nov. 15	43.00
Oct. 1951	43.60
Nov. 1950	41.33
Nov. 1946	22.22

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Basing Point	Grade 1 No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	33.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 1 Busheling	Base
3. No. 1 Heavy Melting	—$1.00
4. No. 2 Heavy Melting	— 1.00
5. No. 2 Bundles	— 1.00
6. Machine Shop Turnings	—10.00
7. Mixed Boring & Short Turnings	— 6.00
8. Shoveling Turnings	— 6.00
9. No. 2 Busheling	— 4.00
10. Cast Iron Borings	— 6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free turnings	— 3.00
24. Heavy Turnings	— 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	— 3.00
27. No. 2 Chemical Borings	— 4.00
28. Wrought Iron	+10.00
29. Shafting	+10.00
30. Hard Steel cut 2 ft & under	+ 5.00
31. Old Tin & Terne Plated Bundles	—10.00

Unprepared Grades

When compressed constitutes:

32. No. 1 Bundles	— 6.00
33. No. 2 Bundles	— 9.00
34. Other than material suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively. (2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10. (3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth. (4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and open-hearth furnaces or foundries. (5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose. (6) Prices for Grade 30 may be charged only when sold to a gray iron foundry; otherwise price for Grade 20 will prevail.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts: Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap.

2. No. 2 Heavy melting Steel	—$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and Iyco. axles with keyways between the wheelseats.	Base
5. No. 1 Busheling	— 3.50
6. No. 1 Turnings	— 3.00
7. No. 2 Turnings, Drillings & Borings	—12.00
8. No. 2 Cast Steel and uncut wheelcenters	— 6.00
9. Uncut Frogs, Switches.	Base
10. Flues, Tubes & Pipes	— 8.00
11. Structural, Wrought Iron and/or steel, uncut	— 6.00
12. Destroyed Steel Cars	— 8.00
13. No. 1 Sheet Scrap	— 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Tires	+ 2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angle, Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+ 12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	— 8.00
32. Boilers	— 6.00
33. No. 2 Sheet Scrap	—13.00
34. Carsides, Doors, Car Ends, cut apart	— 6.00
35. Unassorted Iron & Steel	— 6.00
36. Unprepared scrap, not suitable for hydraulic compression	— 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14. (2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel. (3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1.)

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.
(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3. For preparing into:
(4) Grade No. 25, $6.
(5) Grade No. 19, $6.
(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) Grade No. 17 or No. 21, $11.
(8) Grade No. 18, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:
(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6.
For preparing into:
(3) Grade No. 16, $4.
(4) Grade No. 17, $5.
(5) Grade No. 18, $7.
(6) Grade No. 21, $4.
(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:
(1) For preparing Grade No. 8 into grade No. 7, $8.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premiums for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton: Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c, Bethlehem, Pa., 52c; Birmingham, 50c; Brackenridge, Pa., 53c; Buffalo, 83c; Butler, Pa., 65c. Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 63c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c. Coatesville, Pa., 50c; Conshohocken, Pa., 20c. Detroit, 95c; Duluth, Minn., 50c. Harrisburg, Pa., 51c; Houston, 37c. Johnstown, Pa., 75c. Kansas City, Mo., 78c; Kokomo, Ind., 51c. Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c. Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c. St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 20c; Steubenville, O., 51c. Warren, Pa., 75c; Weirton, 70c. Youngstown, 75c.

HAMILTON, ONT.

(Delivered Prices)

Heavy Melt.	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	35.00
Rails, Rerolling	38.00
Busheling	29.50
Bushelings new factory: Prep'd.	33.00
Unprep'd.	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	55.00

* F.o.b. shipping point.

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The Metal Market

Expansion of domestic mine production and increase in imports of antimony are expected to follow 8-cent advance in prices, established Nov. 21 by OPS through CPR 96

ANTIMONY prices advanced 8 cents a pound, effective Nov. 21. Ceiling prices for carload quantities are set at 50.50c a pound for metal containing a minimum of 99.8 per cent antimony, no more than 0.05 per cent arsenic, and no other single impurity in excess of 0.1 per cent; 50.00c a pound of metal containing a minimum of 99.8 per cent antimony, but having more than 0.05 per cent arsenic or other single impurity in excess of 0.1 per cent; 50.00c a pound of metal containing at least 99 per cent, but less than 99.8 per cent, antimony; 49.50c per pound of antimony content for all other grades of the metal. These prices are on basis of f.o.b. shipping point.

For less than carload quantities of antimony, premium differentials allowed to producers range from 1.50 cents to 8 cents a pound; to importers and dealers, 2.50 cents to 10 cents a pound, depending on quantities ranging from under 100 pounds to 10,000 pounds. A premium of $\frac{1}{2}$-cent a pound may be charged for special packing in cases or boxes.

A delivered ceiling price for carload quantities of antimony oxide in bags is set at 48.00c a pound and for sodium antimonate at 43.00c a pound. A premium differential of 3 cents a pound is allowed for less than carload quantities when the destination is in one of the Pacific Coast states and 1 cent a pound when the destination is in any other part of the continental United States.

World antimony prices have risen to as high as 60.00c a pound. It is expected that the new domestic price level will be adequate to provide an incentive for expansion of domestic mine production and will enable refiners to pay a price for foreign ores to encourage greater output and shipment of such ores to this country.

American Zinc To Expand

Domestic production of slab zinc for defense purposes will be increased 7200 tons under an agreement reached by Defense Materials Procurement Agency and American Zinc Co. of Tennessee, a subsidiary of American Zinc, Lead & Smelting Co., St. Louis. The metal will be produced from the company's ore deposits near North Friends Station, Tenn.

The company will undertake a $340,000 expansion program of its mining and refining facilities in Tennessee. DMPA agrees to purchase at 17.50c a pound up to 300 tons of slab zinc a month produced by the new facilities, providing the company cannot sell it to commercial users at a higher price.

Stocks of slab zinc increased sharply in October to 23,084 tons from 17,235 tons at the end of September. This reflects a rise in production to 79,432 tons in October from 70,623 tons in September, while shipments increased to only 73,583 tons from 64,632. Unfilled orders on smelters' books are steady at 66,293 tons.

LOOKS TO CENTURY: Guests of Chase Brass & Copper Co. saw the operation of this battery of 18 electric furnaces in the casting shop during open house at Chase Metal Works, Waterbury, Conn., held in commemoration of the company's 75th anniversary. This battery of furnaces, out of a total of 48, can melt about 1 million pounds of metal which is subsequently cast in molds to produce 1000-pound ingots. It takes 30 to 60 minutes to metal a charge

Government To Sell Lead

Withdrawal of 30,000 tons of lead from the military stockpile for sale to industry was approved last week. The metal will be transferred from Munitions Board to General Services Administration which will sell it to consumers on the basis of allocations prescribed by National Production Authority.

This move is intended to take care of an expected shortage of lead resulting from a decline in imports. This is the first official notice that lead is being taken from the stockpile.

Tinplate Makers Get Metal

Although supply of tin remains tight, producers of tin plate will be allotted almost the full amount requested for the first quarter of 1952. The industry will be allotted 7500 tons against 7755 tons requested.

Defense Production Administration said 5500 tons will come from the Reconstruction Finance Corp.'s stockpile and 2000 tons from industry inventories. The industry will make up the difference, 255 tons, through conservation measures.

RFC's industrial stockpile of tin now totals 11,340 tons, of which 7500 tons are classified as Grade A. The government-owned Texas City, Tex., smelter is producing about 1650 tons a month. Normally, United States consumes about 15,000 to 17,000 tons of tin a quarter, with the tin plate industry taking about 85 per cent of the total.

An exchange of United States steel for British tin and other metals may be arranged.

Rules on Copper Allocations

Brass and bronze foundries, wire mills and brass mills, with authority to purchase copper, may place advance orders and accept delivery on the first of each month of up to 50 per cent of the quantity of similar materials they were authorized to use during the previous month.

Previously, users of copper raw materials were not permitted to place orders for these products until they had actually received their monthly allocation.

Stocks of refined copper, increased to 78,192 tons at the end of October from 62,093 tons at the end of September. Production jumped to 104,148 tons in October from 74,354 tons in the preceding month while deliveries to fabricators increased to 125,286 tons.

Total tonnage of copper scrap available to the industry during December is not expected to exceed 38 million pounds, copper content, as compared with a normal supply of 54 to 60 million pounds.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 38.50c; 80-10-10 (No. 305) 32.25c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c, East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00c; grade 2, 17.75c; grade 3, 17.25c; grade 4, 16.50c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 103.00.

Antimony: American 99.99.8% and over but not meeting specifications below 50.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 50.50c; f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $220-$222 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $1.50 per lb of alloy, f.o.b., Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55 del.; special or patented shapes $2.80.

Cobalt: 97.99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $80-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill; effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze, 95% 41.61; 90% 41.13; red brass, 85% 40.14; 80% 39.67; best quality, 39.15; nickel silver, 18% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53; cold-drawn 38.78; yellow brass free cutting, 32.63; commercial bronze, 95% 41.30; 90% 40.82; red brass 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90% 43.79; red brass, 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.90; 90% 41.42; red brass, 85% 40.43; 80% 39.96; best quality brass 39.44.

(Base prices, effective Nov. 6, 1950)

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 28.67-30.42; l.c.l. 29.17-30.92; 100,000 lb lots 28.545-30.295; weatherproof, f.o.b. eastern mills, c.l. 29.60-30.60, l.c.l. 30.10-31.10, 100,000 lb lots 29.35-30.35; magnet, del., 15,000 lb or more 34.50c, l.c.l. 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	30.1	...	...
0.135-0.096	12-48	30.6	...	...
0.095-0.077	12-48	31.2	29.1	33.2
0.076-0.061	12-48	31.8	29.3	33.4
0.060-0.048	12-48	32.1	29.5	33.7
0.047-0.038	12-48	32.5	29.8	34.0
0.037-0.030	12-48	32.9	30.2	34.6
0.029-0.024	12-48	33.4	30.5	35.0
0.023-0.019	12-36	34.0	31.1	35.7
0.018-0.017	12-36	34.7	31.7	36.6
0.016-0.015	12-36	35.5	32.4	37.6
0.014	12-24	36.5	33.3	38.9
0.013-0.012	12-24	37.4	34.0	39.7
0.011	12-24	38.4	35.0	41.2
0.010-0.0095	12-24	39.4	36.1	42.7
0.009-0.0085	12-24	40.6	37.2	44.4
0.008-0.0075	12-24	41.9	38.4	46.1
0.007	12-18	43.3	39.7	48.2
0.006	12-18	44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	52.0	....	....
0.156-0.0188	44.0	....	....
0.219-0.313	41.5	....	....
0.375	40.0	46.0	48.0
0.406	40.0	....	....
0.438	40.0	46.0	48.0
0.469	40.0	....	....
0.500	40.0	46.0	48.0
0.531	40.0	....	....
0.563	40.0	....	45.0
0.594	40.0	....	....
0.625	40.0	43.5	45.0
0.688	40.0	....	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	....	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	....	....
1.625	36.5	....	39.5
1.688-2.000	36.5	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 80%.

ZINC

Sheets, 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 24.50-26.50c; over 12-in., 24.50-26.50c.

"A" NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

1951	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Nov. 21	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. 1-20	24.50	18.80	19.50	103.00	19.00	42.00	56.50	88.00
Oct. 5-31	24.50	18.80	19.50	103.00	19.00	42.00	56.50	88.00
Oct. 4	24.50	18.80	19.50	103.00	19.00	42.00	56.50	84.75
Oct. 2-3	24.50	18.80	19.50	103.00	19.00	42.00	56.50	90.16
Oct. 1	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	16.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	16.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	16.80	17.50	117.962	19.00	42.00	56.50	88.492
May Avg.	24.50	16.80	17.50	139.923	19.00	42.00	50.50	90.16
Apr. Avg.	24.50	16.80	17.50	145.735	19.00	42.00	50.50	90.16
Mar. Avg.	24.50	16.80	17.50	145.730	19.00	42.00	50.50	90.16

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c, 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 77.7c; 100 or 350 lb drums only, 100 to 600 lb, 63.1c; 700 to 1900 lb, 60.6c; 2000 to 9900 lb, 58.9c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.19; 500 to 999 lb, $1.195; 200 to 499 lb, $1.20; less than 200 lb, $1.215. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 47.7c, 10 or more drums, 45.7c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.0009; more than 2000 lb, 98.09c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 87.23c; 100 lb kegs 88.23c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group I: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.

Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment)

Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers' plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00 dural type, 9.00; Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

Keep SCRAP
on the move!
Idle scrap does
nobody Good!
Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

Tool Saving Tips

No. 5 OF A SERIES

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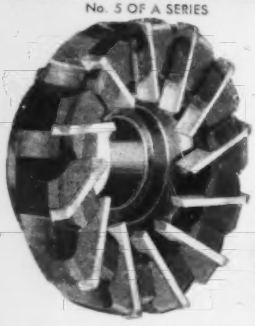


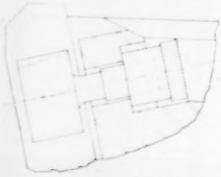
"KF" for STEEL and Heavy Cast Iron Milling

"KF" radial type Kennamill has solid Kennametal blades. For production jobs on steel, and heavy cuts on cast iron. Standard sizes 6", 8", 10", and 12".

"MF" for CAST IRON

"MF" axial type Kennamill has solid Kennametal blades—more per inch of cutter diameter than the "KF"—for high production runs on cast iron. Standard sizes 6", 8", 10", and 12".

Simplify SET UP, DISMANTLING, MAINTENANCE



NEW! ONE PIECE WEDGE AND SCREW

The shank of the stud-type, heat-treated alloy steel wedge extends through the cutter body. The wedge is pulled down, and blade secured, by turning the Allenut — easily accessible at the back of the cutter.

• These precision-built cutters feature strong, long-lasting, solid Kennametal blades—positioned, supported, and wedged by a new, improved design that assures maximum milling service from each unit of carbide consumed. (See sketch at left.) No threads in the cutter body; possibility of "freezing" eliminated.

Blades can be precision set. Wedges and blades for all sizes of each type cutter are interchangeable. For complete particulars, see Catalog 51, and Supplement 2.

KENNAMETAL Inc., Latrobe, Pa.

MANUFACTURERS OF SUPERIOR CEMENTED CARBIDES AND CUTTING TOOLS THAT INCREASE PRODUCTIVITY

Steel Bars . . .

Bar Prices, Page 133

Cleveland—With direct defense requirements for bars on the increase the barmakers are under greater pressure. Indications are there will be substantial carryover tonnage into first quarter part of which will be taken up in the period by the further cutback in supplies to civilian durable goods manufacturers.

Boston—Schedules for first quarter are filled except for spot lots which include some electric furnace chromium alloys on space opened by restrictions on nickel and molybdenum alloys. Inquiries are beginning to come out against defense contracts in heavier volume, notably small arms from forge shops.

Philadelphia—Bar demand is heavy with first quarter books filled. Some mills have opened books for second quarter on alloys. Defense contracts are taking a large portion of bars, both alloy and carbon, notably for forgings.

Pittsburgh—Some district mills plan to open their books for second quarter business but others are not thinking about second quarter at this time. There are still unplaced fourth quarter CMP tickets in the area but mills cannot give them even a nod.

Sheets, Strip . . .

Sheet and Strip Prices, Page 133 & 134

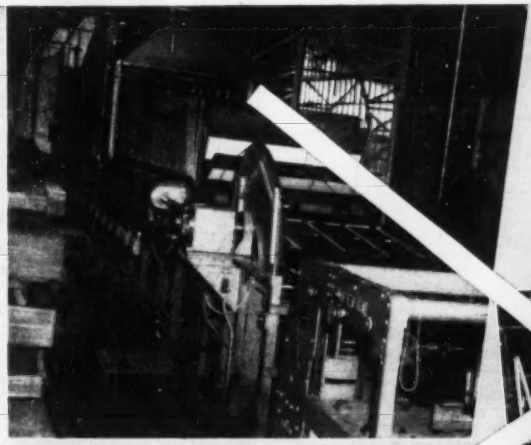
Pittsburgh—District producers expect to lose some strip tonnage due to NPA's request that light plate rollings be diverted to continuous strip mills, but do not believe that too much will be sacrificed. Mills note more and more first quarter tickets being dished out, but are entering no second quarter business for carbon strip and sheets until sometime around the first of the new year. Area mills have notified customers that orders for second quarter will be returned if received at this time.

Boston—Smaller allotments of sheets and strip for first quarter civilian goods exceed the expected increase in defense requirements, but the slack in demand will be offset by production of more light plate tonnage on the continuous mills. Demand for most grades of flat-rolled products has been slipping of late and restrictions on consumption will accelerate this trend in first quarter. The relatively limited number of shops with large defense contracts are specifying heavier.

Philadelphia—Spot tonnages of carbon sheets are appearing following cutbacks and decline in demand. Some mills are again soliciting orders, not only in the East, but also at Detroit, reflecting restrictions on automobile assembly, including suppliers, in first quarter. One Midwest district mill disposed of 1800 tons in this area.

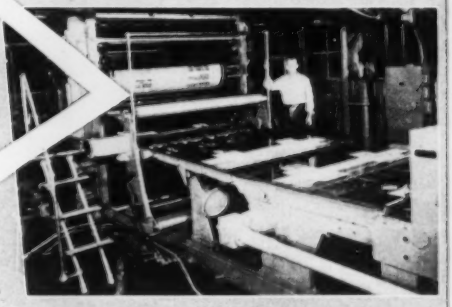
Detroit—Although auto builders are getting out of the conversion market as quickly as they can it is reported here some demand for conversion steel is developing from other directions, notably farm implement manufacturers.

Cleveland—Sheet mills are booked through first quarter but except for high-rated defense tonnage are not yet accepting orders for second quarter. Slower demand on civilian durable goods account has eased the



Rheemcote Process Gas-fired oven at New Orleans plant pre-heats, bakes and cools sheet finishes at 4,200 per hr. rate.

Rheem Manufacturing Company's giant metal offset press lithographs 3′x6′ sheets of 18-gauge steel at a 4,200 per hr. rate.



color lithography on metal depends on GAS for processing at Rheem Manufacturing Company

Rheem Manufacturing Company's engineers worked with engineers of Wagner Litho Machinery Division to develop the GAS oven and related equipment necessary to lithograph and fabricate 55-gallon steel drums.

18-gauge steel sheets, 3′x6′ are fed into the giant offset press at a maximum speed of 4,200 per hr. After printing and coating, the sheets travel through a Gas-fired 210′ oven to be dried:

Pre-heat zone: 200°-275° F. for 6 min.
Baking zone: 175°-450° F. for 15 min.
Controlled cooling zone for 7 min.

After lithographing one side and lining the other, sheets are fabricated into steel drums. This Rheemcote Process permits users to identify their products in drums with familiar, colorful trade-marks. Liquid and solid materials and chemicals are shipped all over the world in these Brand-name drums.

The Rheemcote Process is an example of how GAS can be used to meet specialized problems in a production line. Gas is the ideal fuel to use, because Gas temperatures are readily controlled automatically, because Gas is clean, efficient, and economical. Whatever your requirements, learn how GAS can serve you. Call your Gas Company Representative today for the facts.

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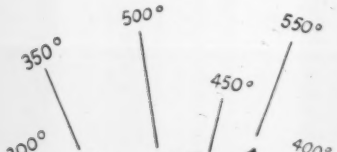

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No. 103	from 450° F. to 500° F.
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pressure on the sheet mills to only minor degree since the resulting slack has largely been offset by diversion of steel to production of light plates on the continuous mills.

Chicago—Sheetmakers here have not experienced the declining demand for cold-rolled sheets to the degree indicated in other centers. That such situation will develop, however, seems inevitable in view of limitations on production of consumer durable goods. Some quickening in demand for electrical sheets is appearing, explained by pickup in manufacture of fractional horsepower motors.

Plates . . .

Plate Prices, Page 133

Pittsburgh—Producers' books have not yet been opened for second quarter carbon plate business. Some fourth quarter CMP tickets still remain unplaced and the mills see little hope of accommodating them. NPA's recent order slashing automobile makers allotments for first quarter to 60 per cent of their requirements will be of definite benefit to the platemakers since it will enable their other customers to secure an additional amount of sorely needed tonnage. It will also bring into the open large amounts of conversion steel.

Boston—Shortages in heavy plates, something like 200,000 tons more per quarter being needed, will not be made up by production of all light plates on the strip mills. For heavy plates an answer seems to be larger ingots and slabs cast by producers of steel other than those rolling flat-rolled products and sent to other mills for conversion. Some December production of heavy plates will be pushed into January.

Birmingham—The district's biggest plate producer expects to enter the new year with considerable unfilled tonnage.

Wire . . .

Wire Prices, Page 135

Philadelphia—Wire mills are looking for orders on some grades, including spring wire. Galvanized wire is in short supply despite cutbacks in some uses.

Boston—More soft spots are developing in wire demand, stimulated by cutbacks in use. Backlog revisions are hampering mill scheduling with frequent shifts in production assignments due to seniority contracts.

Chicago — Wire mills here are booked solidly on all products through first quarter. This is as far as commitments are accepted.

Tin Plate . . .

Tin Plate Prices, Page 134

Cleveland—Expectations are tin plate production in first quarter will hold at about the level of fourth quarter. This, it is said in the trade, is assured by the decision of NPA to allot the industry 7500 tons of the 7755 tons of tin requested for the period. Originally, NPA had planned to provide the industry with only 5000 to 6000 tons of tin. Of the first quarter allotment of 7500 tons, 5500 will come from the RFC stockpile and 2000 tons from industry inventories.

Current demand for tin plate is

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Simply set tolerance hands on the lower dial of this Brinell Hardness Tester to the desired limits and the operator merely notes that the indicator points stop within them.

No grinding or preparation of parts is necessary. Foot operation permits free use of both hands. Tests are completed as rapidly as the operator can handle the parts.

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Makers of Hand and Power Hack Saw Blades, Frames, Metal Cutting Band Saw Blades and Clemson Lawn Machines

1081A

strong but is on a more orderly basis than is the case in several other major steel products. Allotments under the Controlled Materials Plan are understood to be more closely in line with production of the mills.

Expectations in the trade are that contract tin plate prices for 1952 will be delayed until current steel wage negotiations are out of the way. One industry authority here thinks the naming of price may be delayed by some makers until February.

Tubular Goods . . .

Tubular Goods Prices, Page 137

Los Angeles—Casing and tubing are being offered by premium-priced steel brokers at $220 per ton plus "negotiated" brokerage fee. Quantities range from 7000 to 12,000 tons and regular 12 month delivery schedules are quoted.

Seattle—Cast iron pipe demand is slow. Bids are in at Bend, Oreg., for 500 tons, also at Medford, Oreg., for an unstated tonnage. Everett, Wash., has called for bids Dec. 5 for 10,500 feet of 30-in., alternatives invited. Early completion of the branch plant near San Francisco of the U. S. Pipe & Foundry Co. is expected to expedite deliveries to the Pacific Northwest.

Revises Export Price List

New York—United States Steel Export Co. advanced prices on galvanized products to reflect the increase in prices for these products recently announced by steel producers. The action is a direct result of the 2-cent-per-pound increase on slab zinc announced Oct. 2. Export base prices listed include freight to New York, Philadelphia and Baltimore.

Galvanized Products	Discount off List
American Standard Pipe, T & C:	
Buttweld, 2½ and 3 in.	17.4
Seamless, 3½ and 4 in.	7.9
Seamless 5 and 6 in.	10.4
English Gas Tubes, T & C:	
Buttweld, 2½ and 3 in.	19.3
	Per 100 lb
Plain Wire, Galvanized	$6.47
Barbed Wire, Galvanized:	
Glidden 4 pt, 3 in. or 6 in.	7.63
Iowa 4 pt, 3 in. or 6 in.	7.63
Waukegan 4 pt, 3 in. or 6 in.	7.63
	Per 80 rod Spool
Lyman 4 pt, 5 in.	$6.56

Structural Shapes . . .

Structural Shape Prices, Page 133

Boston—Assurance of more structural steel for steel industry expansion and other defense plants, narrows the tonnage for other construction. For steel expansion, the industry will get what it asked for in first quarter compared with but 55 per cent of the tonnage requested for fourth quarter. The same is true of the aluminum expansion program.

Philadelphia—Structural mills are practically sold out for first quarter. Allocations of structural steel in the period approximate 900,000 tons about same as in fourth quarter. Production is expected to be about 125,000 tons heavier next quarter.

Pittsburgh—Supply remains extremely tight with little improvement looked for during the next 3 or 4 months. Fabricators complain they need more steel but mills are not able to supply them. First quarter requests were about 200 per cent of estimated supply.

Seattle—Fabricating shops are booked to the end of first quarter and show interest in forward business though unable to accept contracts calling for early completion.

Semifinished Steel . . .

Semifinished Prices, Page 133

Pittsburgh—A new ingot production record was set by the Aliquippa Works of Jones & Laughlin Steel Corp. last month with the plant operating at 119.19 per cent of rated capacity. The inget rate at the corporation's three plants last month was 107.18 per cent which resulted in the best ingot tonnage for the steelmaker thus far in 1951.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 133

Chicago—Suppliers of reinforcing steel and allied products have more demand than they can possibly accommodate in view of their limited steel supply. Rail steel bar producers

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are unable to get enough rerolling rails to keep their facilities fully occupied.

Seattle — Substantial inquiry for small lots of reinforcing bars is current but the mills are selective in accepting new business. Largest job pending currently involves 1000 tons for the third unit, Seattle's waterfront viaduct. Considerable Alaskan business is in prospect for 1952.

Iron Ore . . .

Iron Ore Prices, Page 139

Cleveland—Stocks of Lake Superior iron ore on Nov. 1 were about 27 per cent larger than they were a year ago and equivalent to about 6½ months' consumption at the current rate. Total stocks amount to 50,229,034 gross tons compared with 45,453,446 tons on Oct. 1 and 39,710,796 tons on Nov. 1, 1950. With only 3 furnaces idle on Nov. 1 out of a total of 195, consumption amounted to 7,749,424 tons in October against 7,472,777 tons in September and 7,415,357 tons in October, 1950. A year ago, 10 furnaces were idle, all in the United States.

Iron ore shipments from the head of the lakes in the week ended Nov. 19 totaled 1,533,543 tons bringing the season's total to 86,360,035 tons. On the corresponding date last year the season's movement amounted to 75,319,557 tons.

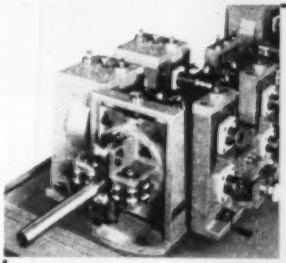
Scrap . . .

Scrap Prices, Page 140

Pittsburgh—District brokers were concerned last week over the snow and blizzards beating the Western Pennsylvania area. With scrap in such short supply it is questionable whether open-hearth plants will be able to sustain the current high steelmaking rate which has been prevalent in this district. Receipts have been disappointing and steel companies are worried about the early winter weather which will materially lessen scrap collections. One district producer has been prohibited from taking in more scrap for the next few weeks due to its excellent inventory.

Cleveland—Collection and processing of scrap dropped sharply in this district last week. Heavy snowfall and freezing temperatures hampered operations while observance of the holiday halted activity one full day. Movement of material has also slowed since certain excess profits provisions of the federal revenue act tend to encourage withholding of material from the market until Jan. 1. Supply of cast scrap is tightening. Some foundries which had been in fairly comfortable position are now pressing for increased shipments. Some progress is reported in the local government-sponsored scrap drive. In the last few weeks 150 companies in this area have dug out 5000 tons of scrap. Goal of the local campaign is for 70,000 tons.

Boston — Upgrading has been reduced by placing heavy melting steel grades equally at $33.17 f.o.b. Boston. This represents an increase of $1 per ton on No. 2 and a decrease of $1 on No. 1. The scrap drive is bringing slightly larger tonnage to yards, but mill inventories continue low. Cast



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supplies are in relatively better shape than steel grades, with buying spotty.

Buffalo—With approximately 4000 tons of scrap being shipped out of the area under allocation, local mills report sharp reduction in reserve stocks and a much gloomier supply outlook. Mills are receiving only a trickle of stock from dealers. They have about two weeks' supply.

Detroit—A few brokers report easing in pressure from mills for increased scrap shipments. One believes this is caused in part by greater charging of wasters which formerly were sold as steel. The decline in scrap intake resulting from the low spread of dealer-to-dealer transactions is expected to become increasingly noticeable. Industrial scrap generation continues to decline.

Chicago—Steelmaking scrap situation here is spotty. Some mills are losing inventory and others are picking up slightly. Shipments of allocated material to the East are about completed. Second week of dormant scrap drive in Chicago turned up another 3000 tons and the Nov. 15 drive in Racine, Wis., netted 2650 tons.

Birmingham—Heavy melting steel remains tight in this section with no upgrading in evidence.

Seattle—Steel scrap continues in critically short supply. Plants are operating on day-to-day inventories. Receipts are not increasing.

Pig Iron . . .

Pig Iron Prices, Page 132

Boston—The district blast furnace holds a small pig iron inventory as winter approaches. Some of its current production is being stocked. Malleable production at this stack is running slightly ahead of No. 2 foundry grade.

Cleveland—Pressure on the merchant iron sellers is off somewhat reflecting the slackening in demand for castings on civilian durable goods account. Aiding in the easier situation in the market is the resumption of production by a merchant stack here that had been out of operation for repairs for almost two months.

Chicago—Pig iron appears available in sufficient supply to meet current needs of foundries.

Warehouse . . .

Warehouse Prices, Page 139

Cleveland—Although warehouse customers are not pressing for tonnage to the same extent they were some months back, reflecting slackening in civilian durable goods, distributors' stocks are inadequate to care for all the requests coming to them.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

520 tons, state highway bridges, Boxford-Georgetown-Rowley, Mass., to Bethlehem Steel Co., through Campanella & Cardi Co., Hillsgrove, R. I., general contractor.

200 tons, fruit ripening plants, Mellow Ripe Fruit Co., Dedham, Newton and Medford, Mass., to West End Iron Works, Cambridge, Mass.; Morton C. Tuttle Co., Boston, general contractor.

STRUCTURAL STEEL PENDING

220 tons, Washington state bridge, Grays Harbor county; general contract to Neukirch Bros., Seattle.

110 tons, third unit Seattle viaduct; general contract to MacRae Bros., Seattle.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1200 tons, hot strip mill, Pittsburgh Steel Co., Allenport, Pa., to United States Steel Supply Co., Chicago.

400 tons, International Graphite & Electrode Corp., Niagara Falls, N. Y., to United States Steel Supply Co., Chicago.

325 tons, propeller test stand, Wright Field, Dayton, O., to United States Steel Supply Co., Chicago.

260 tons, Fenwick high school, Oak Park, Ill., to Olney J. Dean Steel Co., Chicago.

115 tons, fruit ripening plants, Dedham, Newton and Medford, Mass., to Atlantic Trading Steel Co., Boston (Belgian bars); Morton C. Tuttle Co., Boston, general contractor.

REINFORCING BARS PENDING

1125 tons, Beverly-Calumet sewer system, contract 3A, Chicago.

1000 tons, third unit Alaska viaduct; general contract awarded MacRae Bros., Seattle.

450 tons, Harms intercepting sewer, Northbrook, Ill.

315 tons, Weiss Memorial Hospital, Chicago.

150 tons, Washington state highway bridge, Grays Harbor county; general contract to Neukirch Bros., Seattle.

PLATES . . .

PLATES PENDING

100 tons or more, additional tanks, bulk storage facilities, Rockbourne Air Force base, Ohio, including twenty 50,000-gallon tanks, three 25,000-gallon tanks, and four 25,000-barrel tanks; bids Dec. 18, Corps of Engineers, Huntington, W. Va.

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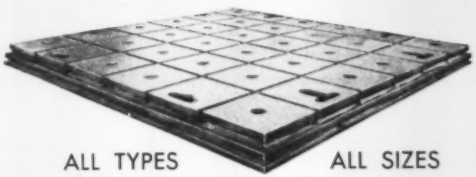

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Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

National Alloy Expanding

National Alloy Steel Division, Blaw-Knox Co., Pittsburgh, is enlarging and rearranging its plant facilities in Blawnox, Pa., to provide a 25 per cent increase in capacity. Involved in the project is an extension of the main foundry building, installation of additional molding and centrifugal casting equipment, and improved shop layout to permit better flow of production.

Acme Steel Erects Building

Construction of a $500,000 storage and woodworking building at its Riverdale, Ill., plant is the latest step in Acme Steel Co.'s expansion program. The building will free present storage areas for manufacturing operations.

Monarch Iron Works Moves

Monarch Iron Works is moving its plant from San Francisco to Marinship on the north of San Francisco bay. A 12,000-foot building will be erected immediately and other structures are planned for the future. A 600-ton press, one of the largest on the Pacific Coast, will be installed.

Wheeler and Economy Merge

Hamilton - Thomas Corp., Hamilton, O. is consolidating its Economy Pump Division with C. H. Wheeler Mfg. Co., Philadelphia, another division of the corporation. Production, engineering and sales departments of Economy are being moved to the Philadelphia plant.

Vickers Conveyor Organized

Vickers Conveyor & Steel Works Inc., Wichita, Kans., has been granted a charter by the state of Kansas.

Pratt & Whitney Expanding

Construction of a major addition to its facilities in East Hartford, Conn., has begun at Pratt & Whitney Aircraft Division, United Aircraft Corp. Other projects being constructed include a home for Hamilton Standard Division at Bradley Field, Windsor Locks, Conn., and a Pratt & Whitney Aircraft branch at North Haven, Conn. The new East Hartford addition will have 180,000 square feet of manufacturing area, plus office space, locker rooms and a cafeteria. Pratt & Whitney Aircraft will take over the new addition and the present Hamilton Standard plant next spring when the Hamilton Standard division moves to its Windsor Locks plant.

Landis Moves Detroit Office

Detroit branch office of Landis Tool Co., Waynesboro, Pa., moved to 17151 Wyoming Ave.

Builds Airplane Parts Plant

General Fireproofing Co., Youngstown, has started construction of a $600,000 addition to its plant. This is part of a $1.5 million project planned for expanding manufacture of airplane parts. The first addition will add about 70,000 square feet of floor space.

Tube Firm in New Locations

Pipe & Tubular Products Inc., Philadelphia, moved its operations to a plant recently purchased in Catasauqua, Pa. Business offices were moved to 8504 Germantown Ave., Chestnut Hill, Philadelphia. The company is engaged in warehousing boiler tubes and condenser tubes. It has expanded its operations to include all pipe and tube bending, power piping, machining and engineering.

Plans $5 Million Plant

A permit was issued in Niagara Falls, N. Y., for construction of new plant facilities for International Graphite & Electrode Corp., St. Marys, Pa. to cost between $4.5 million and $5 million. The project will permit a 50 per cent expansion of the plant's production facilities.

Allied Research Reorganizes

Allied Research Products Inc., Baltimore, organized two subsidiary companies. Allied Metal Finishing Corp. will assume responsibility for the job shop metal finishing business previously conducted by the parent organization; Allied Research Sales Corp. will handle the national sales of metal finishes and plating chemicals produced by the parent company. H. C. Irvin is president of the parent and subsidiary companies.

Plans Deep Mining Operation

Extensive new operation on the Gogebic range of Puritan Mining Co., owned jointly by Youngstown Sheet & Tube Co. and Bethlehem Steel Co., will be named the Peterson Mine in honor of Arthur F. Peterson, vice president, Mining Division, Bethlehem Steel Co. The Peterson Mine consists of

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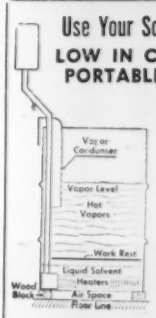

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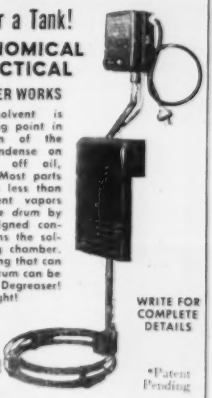

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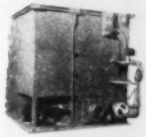

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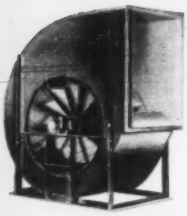
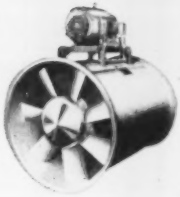


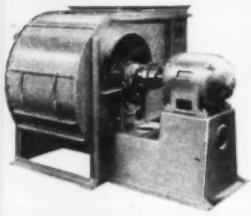
LIMIT-LOAD FANS

For large-scale ventilation. Quiet, non-overloading. Sizes up to 500,000 c.f.m. Bulletin 3675.



AXIAL FLOW FANS

For light-duty ventilation and air conditioning service. Compact, non-overloading. Bulletin 3535-C.



POWER PLANT FANS

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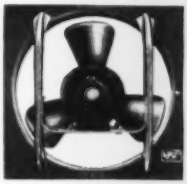
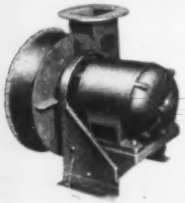


BREEZO FANS

Easy-to-install wall fans. Durable and very economical. 6 sizes. Bulletin 3222-F.



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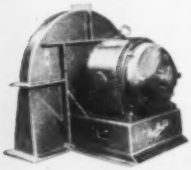
For single-stage pressure blowing up to 2½ pounds per square inch. Bulletin 3555-A.



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In sizes for pressures up to 4 pounds and capacities up to 75,000 c.f.m. Bulletin 3555-A.

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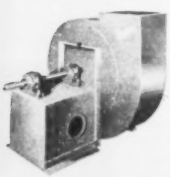

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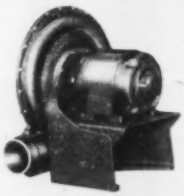
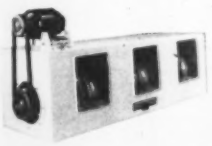


"E" BLOWERS—EXHAUSTERS

For oil or gas furnace blowing, lime boosting, cleaning. Bulletin 3014-C.



SHORTBOY VENTILATING SETS

New high efficiency all-aluminum blowers with hollow shaft. Bulletin 3701.

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For blowing or exhausting, up to 10" s.p. 8 discharge positions. Bulletin 3615-A.

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what were formerly known as Puritan, Ironton, Yale and Colby mines which were operated by other interests for various periods dating back to 1885. Operations were carried on in these mines to a maximum depth of about 2000 feet. By grouping these properties, deep mining operation is justified and the sinking of a shaft from surface to a depth initially of 3900 feet has been undertaken. Subsequently, other shafts, change house, offices and warehouse will be built to serve this facility.

Magnethermic Opens Plant

Magnethermic Corp., Youngstown, opened its new plant at 3990 Simon Rd., that city. The company produces low-frequency induction heaters.

Plans $1.5 Million Addition

British American Oil Co., Toronto, will construct a $1.5 million grease plant addition to its refinery at Clarkson, Ont.

Broach Firm Names Agent

Colonial Broach Co., Detroit, appointed Oliver H. Van Horn Co. Inc., New Orleans, as its representative in Louisiana and Mississippi. Colonial makes broaching machines, broaches, broach sharpening equipment, etc.

Pipe Plant Opens in West

California plant of United States Pipe & Foundry Co., Burlington, N. J., began operations early in November. This marks the first time that cast iron pressure pipe has been cast centrifugally in metal molds on a production basis in any of the Pacific Coast states. For the present, pipe in diameters 4 to 12 inches will be cast in the plant, located at Decoto, Alameda county, California. Provision has been made for future expansion and development of plant facilities.

Hard Rubber Firm Moves

American Hard Rubber Co. moved to 93 Worth St., New York 13. This company is the oldest rubber manufacturer now active in the entire rubber industry and is celebrating its 100th anniversary this year.

Conveyors Firm Expands

Speedways Conveyors Ltd. opened new general offices in Toronto, Ont., at 2908 W. Bloor St. The firm was formerly located in Winnipeg. The company's manufacturing plant is located in Stratford, Ont. A new plant is being constructed to help accommodate increased production.

Hobart Buys Sterling

Hobart Mfg. Co. Ltd., Owen Sound, B. C., manufacturer of electric food machines and kitchen appliances, bought the plant and equipment of Sterling Machine & Mfg. Co. Ltd., in Owen Sound.

Rotex Punch Opens Plant

Rotex Punch Co., Oakland, Calif., opened a second plant at 5215 E. 12th St., that city. The company makes turret punch presses and will add a new power model punch press to its line after the first of the year. The new 7000 square foot plant will be devoted to office space, assembly, warehouse and shipping.

Celebrates 50th Anniversary

Thompson Products Inc., Cleveland, released a booklet, *Background for Tomorrow*, in commemoration of its 50th anniversary. The company has increased its

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product lines from one to 69, its customers from 3 to over 5000, its sales from $247 to $200,000,000 annually, its employees from 29 to over 16,000, and its plants from 1 to 11. While taxes were negligible in 1901, they are estimated at $20 million for 1951. Thompson has penetrated into several new fields in the last few years, while maintaining and expanding its position as a maker of aircraft engine parts and accessories and as a major supplier of parts for automotive and other engines. It has developed and manufactured the coaxial switch and achieved an improved process of mercury casting. The company recently made a successful entry into the field of powder metallurgy.

Stonhard To Erect Building

Stonhard Co., Philadelphia, will erect a $600,000 commercial building at the northwest corner of Broad and Huntingdon, that city. The building will house the company's offices, warehousing, and manufacturing facilities. The firm's products include materials for floor repair and resurfacing, and roofing.

James Flett Opens Branch

James Flett Organization Inc., Chicago, opened West Coast offices at 3440 Wilshire Blvd., Los Angeles. David Bopp is in charge of this office. The organization establishes scrap segregation systems for industrial concerns and markets their scrap products.

American Laundry Expanding

American Laundry Machinery Co., Cincinnati, is erecting a $750,000 factory building in Rochester, N. Y. The plant will have 92,000 square feet of floor space. The plant will house sheet metal fabrication, welding, receiving department, cafeteria and general offices.

Shell Chemical Opens Office

Shell Chemical Corp., New York, opened a sales office in Atlanta. M. W. Ellison is manager of the new sales district.

Hajoca Gets Distributorship

United States Rubber Co., New York, appointed Hajoca Corp., Philadelphia, a distributor of electrical radiant heating panels which it makes. Hajoca is a manufacturer and wholesaler of plumbing and heating equipment.

Plans $3.2 Million Project

A city of 400 homes, complete with sewers, pavements, parks, playgrounds and shopping center, will be built at the south edge of Tucson, Ariz., for employees of Hughes Aircraft Co.'s electronics factory. The project is being built by Sunland Engineering & Development Co. at a cost of about $3.2 million.

Ore-Coal Contract Extended

Premier Smallwood of Newfoundland said recently that his government has continued an agreement with the Dominion Steel & Coal Corp., Sydney, N. S., to provide iron ore and coal for a proposed steel plant near St. Johns, N. F. The plant will be operated by a European concern.

Plans To Make Fiber Glass

Pittsburgh Plate Glass Co., Pittsburgh, will enter the fiber glass production field in the near future. Formation of a separate development and production unit to be known as the Fiber Glass Division is now in process. Fiber glass will be manufactured under licensing agreement with Owens-Corning Fiberglas Corp., Toledo, O.

Hufford Machine Moves

Hufford Machine Works Inc. moved into a new plant at 1700 E. Grand Ave., El Segundo, Calif. Special hydraulic stretch forming equipment for aircraft manufacturers is produced.

Canton Firm Buys Metroloy

Automatic Steel Products Inc., Canton, O., purchased Metroloy Corp., New Rochelle, N. Y., a producer of cold-formed steel articles. The parent company is a producer of automotive components and machine tools. Leo Edelson and Harry S. Schwartz, Metroloy president and treasurer, respectively, will remain in their present positions.

Incorporation Papers Filed

Charters of incorporation were filed with the secretary of state's office, Dover, Del., by the following who list their resident agent or principal office as indicated: Crusader Corp.—machines—Colonial Charter Co., Wilmington, Del.; Haggerty Ordnance & Mfg. Co. Inc.—machinery—Corporation Trust Co., Wilmington; Metals & Materials Inc.—machinery—David A. Eastburn, Wilmington; Washington Steel & Ordnance Co.—machinery—Isaac D. Short, Georgetown, Del.; Southern Aero Inc.—machines—Prentice Hall Corporation System Inc., Dover; Walster Corp.—steel—U. S. Corporation Co., Dover; Cen-Vi-Ro Pipe Corp.—machinery—U. S. Corporation Co., Dover; Delaware Machine & Mfg. Co. Inc.—machinery—with its principal office located in Rehoboth Beach, Del.

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50,000 pounds 4" x 3½" x 5/16" x 60-65'
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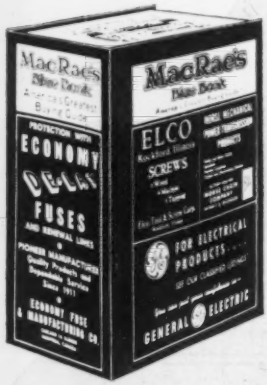

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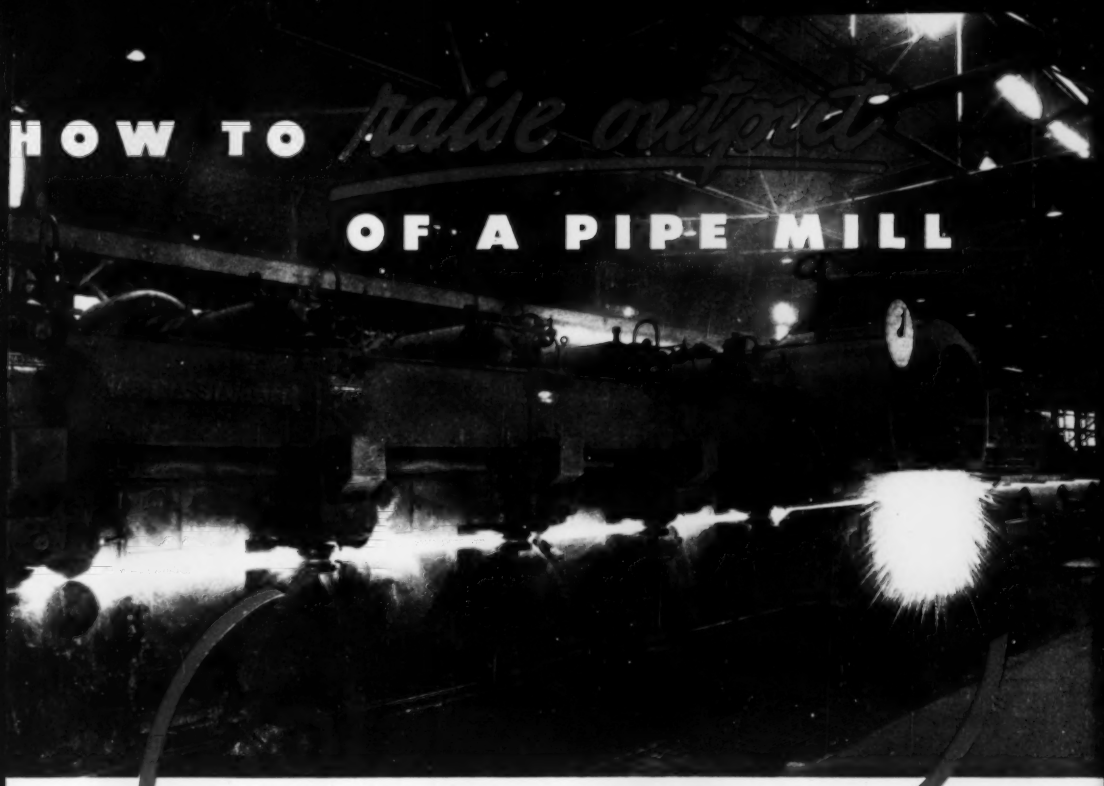

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Reduces costs while it reduces gauge with help of TIMKEN® bearings

THE 3-stand 98" tandem cold mill shown below is reducing the gauge of wide strip steel from .100 to .035. Built by United Engineering and Foundry Company, the mill is designed to roll steel at maximum speed and minimum cost. One way United insured this was to mount the work rolls on Timken® tapered roller bearings.

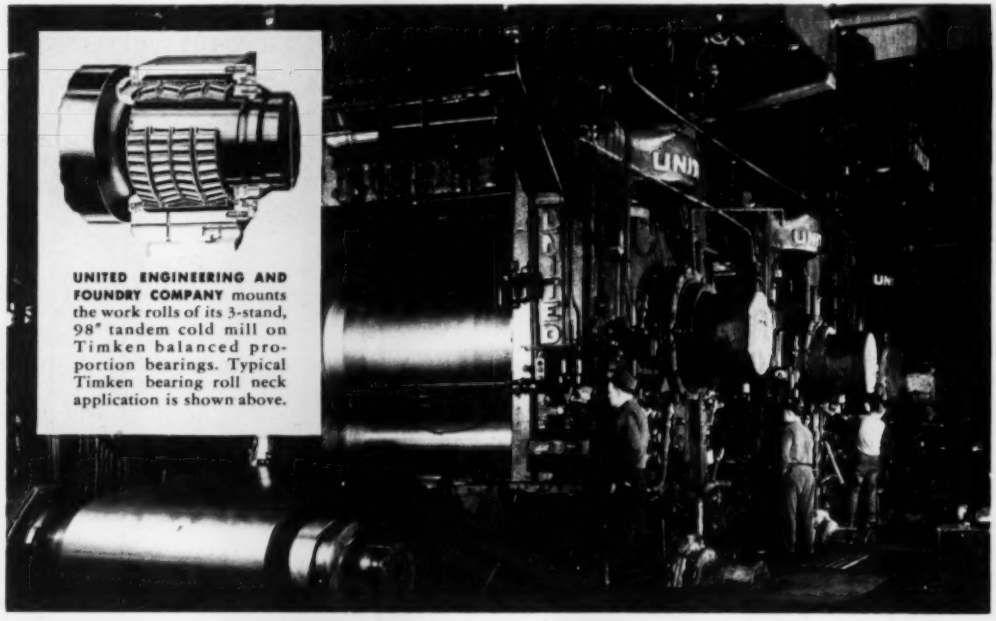
Timken bearings provide greater mill rigidity because they permit larger diameter roll necks, due to their balanced proportion design. Roll neck strength is increased 50 to 60%. Load ratings are upped as much as 40%.

High rolling mill speeds are possible because of the true rolling motion and incredibly smooth surface finish of Timken bearings. Wear on roll necks is minimized, longer life assured. Because Timken bearings permit mills to start smoothly and easily under full loads, they can be stopped and restarted without loss of steel. Gauge setting is not disturbed—no time wasted resetting rolls.

Timken bearings eliminate complicated lubrication systems, permit the use of simple and economical grease lubrication. Rolls can be changed quickly and easily. No special thrust bearings are needed because Timken bearings take radial and thrust loads in any combination.

No other bearings can offer the advantages of Timken bearings. Be sure to specify them for roll necks on both new and existing equipment. For full information consult our roll neck bearing specialists. Write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



UNITED ENGINEERING AND FOUNDRY COMPANY mounts the work rolls of its 3-stand, 98" tandem cold mill on Timken balanced proportion bearings. Typical Timken bearing roll neck application is shown above.

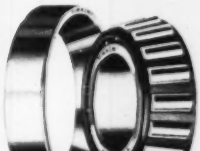
DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roll ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ↓ AND THRUST ←○→ LOADS OR ANY COMBINATION